GREEN LINKS

An Urban Green Space Plan For Downtown Brockton

Prepared for the City of Brockton's Economic Development and Planning Department, Brockton, Massachusetts

Sunnie Joh • Amanda Pebler • Emmy Titcombe
The Conway School • Winter 2018

GREEN LINKS

An Urban Green Space Plan For Downtown Brockton

Prepared for the City of Brockton's Economic Development and Planning Department, Brockton, Massachusetts

Sunnie Joh • Amanda Pebler • Emmy Titcombe
The Conway School • Winter 2018

Acknowledgments

We would like to thank the many professionals, organizations, and community members who participated in public meetings and the design process, helping to shape these recommendations for Downtown Brockton's green spaces. Without their effort, this report would not have been possible.

Rob May, Shane O'Brien, Megan Shave, and Pam Gurley from the City of Brockton Department of Planning and Economic Development; Marta J. Nover, Principal, Nover-Armstrong Associates, Inc; Chike Odunukwe, City of Brockton Engineer; Joseph Johnson, Head Systems Analyst for the City of Brockton; Bill Hogan, The Downtown Brockton Museum; Matthew Dyer and Kyle Reisner, Massachusetts Department of Conservation and Recreation, Greening the Gateway Cities Program

A special thanks to the faculty, staff, and alumni of The Conway School, for their expertise, support, guidance, and numerous rounds of edits.

And to our fellow classmates, thank you for inspiring us with your insatiable search for knowledge, tireless work, and humor.

Table of Contents

Executive Summary • 1

Introduction • 2

Existing Conditions & Analysis • 8

Process & Guiding Principles • 36

Recommendations • 42

- Park Specific • 44
- Concepts for Downtown • 69

Toolkit for Activation • 82

Planning for Implementation • 91

Appendix • 93

Executive Summary

Parks can be a huge asset for city residents...

Brockton is a culturally diverse city that is in the midst of growth and redevelopment. In order to improve quality of life for current residents and attract new investment to the City, Brockton is seeking to revitalize its downtown parks. This initiative has grown out of the city's overarching goals to foster community, integrate mixed use development, and provide quality services and amenities throughout the City (Blueprint for Brockton).

Parks can be vibrant spaces that foster connections between people of all cultures and ages. They are spaces that bring people together to enjoy and learn about the natural world, offer opportunities for physical activity, and function as quiet havens of renewal. Additionally, parks and green spaces perform valuable ecological services in the community. They infiltrate stormwater, reduce air pollution, provide wildlife habitat, and sequester carbon. The services provided by city parks are numerous and vary according to their size, physical condition, and context. In short, there is no single solution that will activate the benefits Brockton hopes to gain from its green spaces.

Brockton's industrial history has fragmented the city's green space. In addition, community perceptions of poor park safety have left the city's parks empty and underused. Brockton faces many challenges as it seeks to integrate the parks with a rapidly changing and increasingly diverse city fabric. There are many physical changes that can be made in the parks and surrounding infrastructure in order to meet Brockton's green space goals. This report recommends that the City implement stormwater best management practices, increase tree canopy, improve lighting, and provide park amenities such as seating, public restrooms, and recreational opportunities.

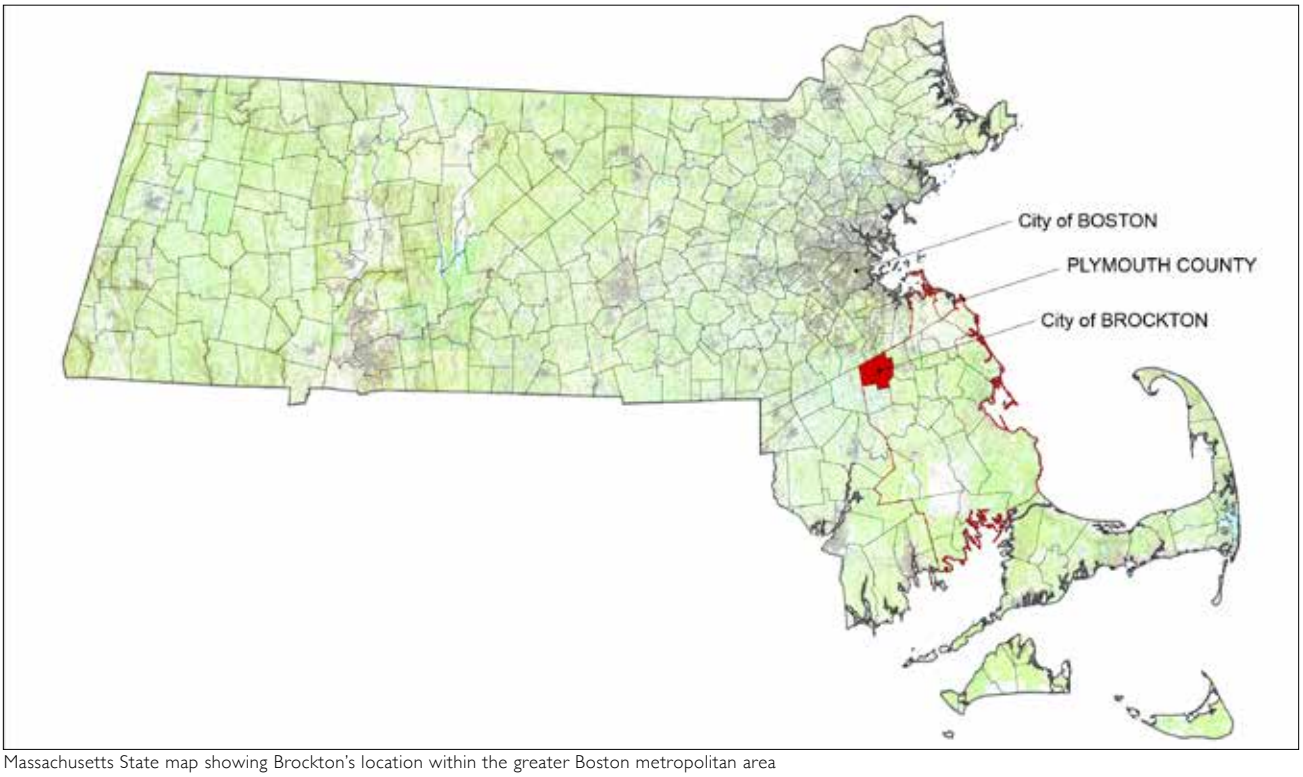
Changing perceptions around the parks and recreating them as attractive and active community spaces will require substantial community buy-in. This report concludes by recommending that the City develop strong community outreach and neighborhood-led planning strategies to ensure that park revitalization efforts meet the needs of current residents. In addition, it is recommended that the City partner with community organizations to activate and program the parks. Community engagement takes time and patience. It is much more difficult to develop community rapport than to install bioswales or public restrooms. But parks are brought to life by the people who use them. In order to ensure the success of Brockton's green space revitalization plans it is crucial that all residents are engaged in the planning and activation of the City's downtown parks.

Introduction

Brockton Today

The City of Brockton is located in the northwest corner of Plymouth County in Massachusetts. Just 20 miles south of Boston, the city is connected to the greater Boston metropolitan area via the commuter rail that runs though the center of the city. With a population of around 95,000, Brockton is the sixth most populated city in the State of Massachusetts (Census 2016). Made up of 22 square miles of land, Brockton is less densely populated than other populous cities near Boston, such as Cambridge and Somerville, and ranks 27th in population density statewide (Carroll). The Greater Boston Metropolitan Area estimates Brockton's population will increase over the next decade, as will the demand for multifamily housing in Brockton's downtown.

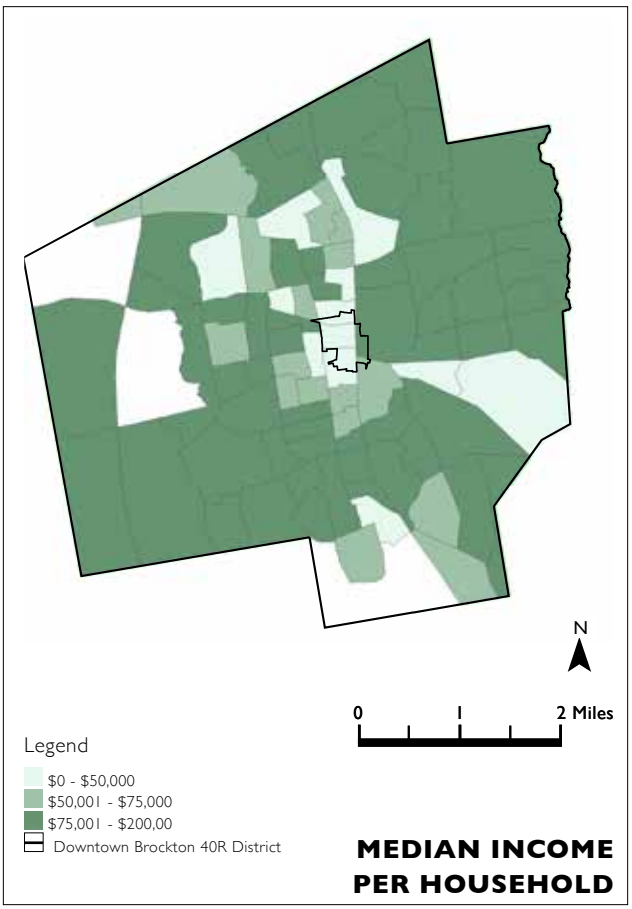
Downtown Brockton is primarily commercial and forms the core of the city with old industrial development running along the eastern side. Spread out from its core, are neighborhoods with densely populated multifamily residences and less dense single family homes towards the outer edges of the city. The downtown core is home to the lowest income residents and the greatest number of minority populations. People identifying as white are concentrated to the suburban subdivisions on the outer edges of the city, leaving a socioeconomic divide. The median household income within the city is around $50,000, $20,000 below the state average (U.S. Census Bureau). About 18% of the population lives below the poverty level. There is also a large homeless population in Brockton, and many of these individuals reside at the shelter downtown adjacent to Perkins Park.



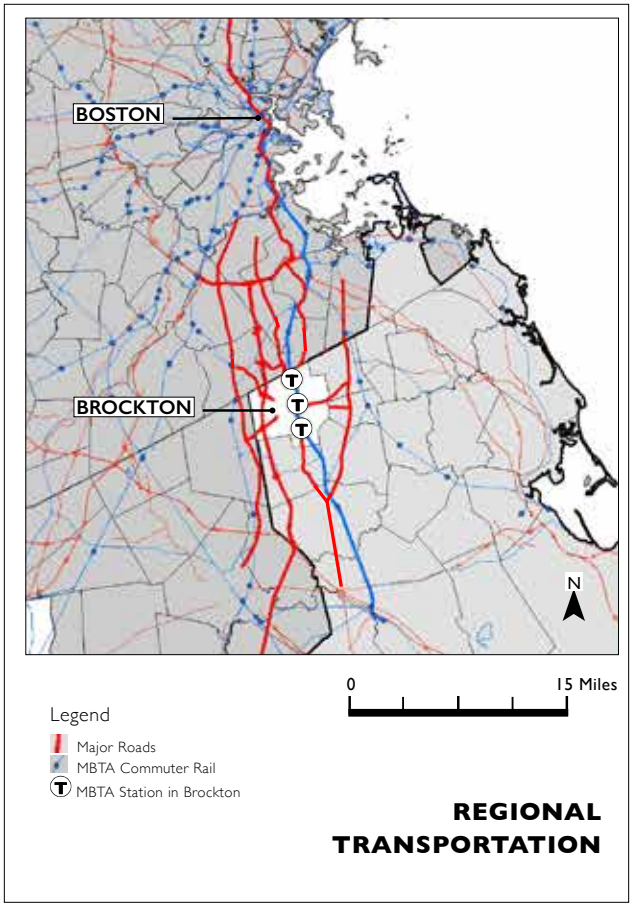
Massachusetts State map showing Brockton's location within the greater Boston metropolitan area

Crime in Brockton clouds residents' image of the city and is a barrier to investment. Although crime is an issue in the neighborhoods surrounding downtown, there are ways in which the city can invest in safer streets and green spaces.

Brockton is culturally diverse and has large immigrant populations from Cape Verde and Haiti. In fact, 26% of Brockton citizens are foreign born. The makeup of the city is currently 41% White, 39% Black, 10% Hispanic or Latino, 2% Asian, with 8% identifying as more than one race or "other". Brockton is also a young city with a median age of 36 (DataUSA). Brockton has been voted the best community for young people four times in the last decade for its commitment to educating its youth (COB). A diverse second generation of Brockton leaders is now emerging within the community and is an asset in advocating for revitalization and shaping the future of the city.



Residents of downtown Brockton have some of the lowest median household incomes within the city.



The commuter railway runs through Brockton with three local stations.

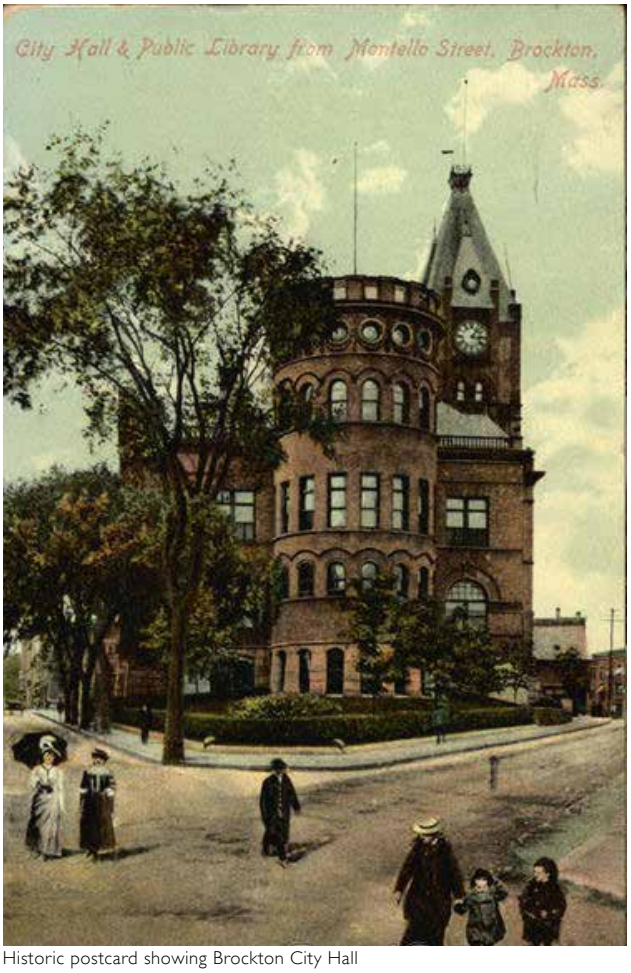
Brockton's Industrial Past and Economic Future

Between 1840 and 1950, Brockton was an industrial city and mecca for shoe production. It was previously referred to as "Shoe City" with over 100 shoe factories producing textiles and shoes. The rise of industry was powered by the regional rail line, electric power, a strong work force, and the headwaters of the Taunton Watershed. Though industry brought a vibrant economy to Brockton, it also created a legacy of pollution within the waterways and land in the city's downtown.

Today, the State of Massachusetts recognizes Brockton as a Gateway City. These midsize urban cities are places where industry once fueled the economy and provided a "gateway" for immigrants to the American Dream. Gateway Cities have historically welcomed immigrant populations, building a strong workforce that fueled regional economies in the early twentieth century. Gateway Cities, like Brockton, saw a dramatic shift in their economy as industry moved out and now struggle to draw new economic investment (MassINC).

Industry and jobs in Brockton have more recently shifted to the healthcare and education sectors. Brockton is currently making strides towards reinvesting in the city's infrastructure downtown. More than 134 million dollars have been invested in downtown Brockton for mixed low income and market rate housing, retail, office buildings, and parking. Brockton's 2015 Downtown Action Strategy proposes an increase in mixed use development downtown, including dense multifamily housing. With Brockton's expected population growth and increasing middle class, change is underway.

Historic view of "Shoe City"



Historic postcard showing Brockton City Hall

The Brockton of tomorrow is a vibrant middle class city that provides an affordable, urban, residential alternative to the housing burdened Boston Area. The city's master plan, *Blueprint for Brockton*, identifies the following vision for Brockton:

Brockton will be valued and increasingly recognized by everyone as a high quality and affordable place to live, work, or visit because it offers all dimensions of a 21st century city. Its acknowledged quality of life will be linked to the character of our neighborhoods and the complete range of services, amenities, and housing choices geared to our residents.

Our prosperity will grow with the new businesses and land redevelopment attracted by the benefits of a community offering both urban and neighborhood residential districts that are exceedingly well connected to the region through our transit and roadway access. As a 21st century city, we will build on our historic resources and character, but become a leader in the emerging trend that values innovative use of land, mixing of uses, and provision of services, within attractive, walkable districts" (5).

D.W. Field Park

The City of Brockton has a rich history of valuing open space and utilizing its natural resources.

The Keith Family once dominated the shoe industry with sales exceeding 12 million dollars in 1910 (Keith Park Neighborhood Association). The company's values, vision, and innovation for a sustainable industry stretched beyond shoes. Known for investment in a healthy workforce, the company provided healthcare, meals, and recreational and educational opportunities, laying the groundwork for Brockton's pattern of land use.

The remnants of Brockton's industrial era are seen today in its historic architecture and parks system. D.W. Field park was designed in 1925 by famous landscape architect Frederick Law Olmsted. The land was donated by Daniel Waldo Field— a shoemaker, farmer, and merchant in Brockton who also valued open space within the city (COB).

As the economy shifted away from industry and took a downturn, existing green spaces suffered from neglect. What was once contiguous green space defined by streams, is now a system of fragmented open space intersected by ecologically degraded waterways. Brockton's reinvestment in green spaces pays homage to the city's past and strengthens its intention to provide a healthy environment for its citizens.

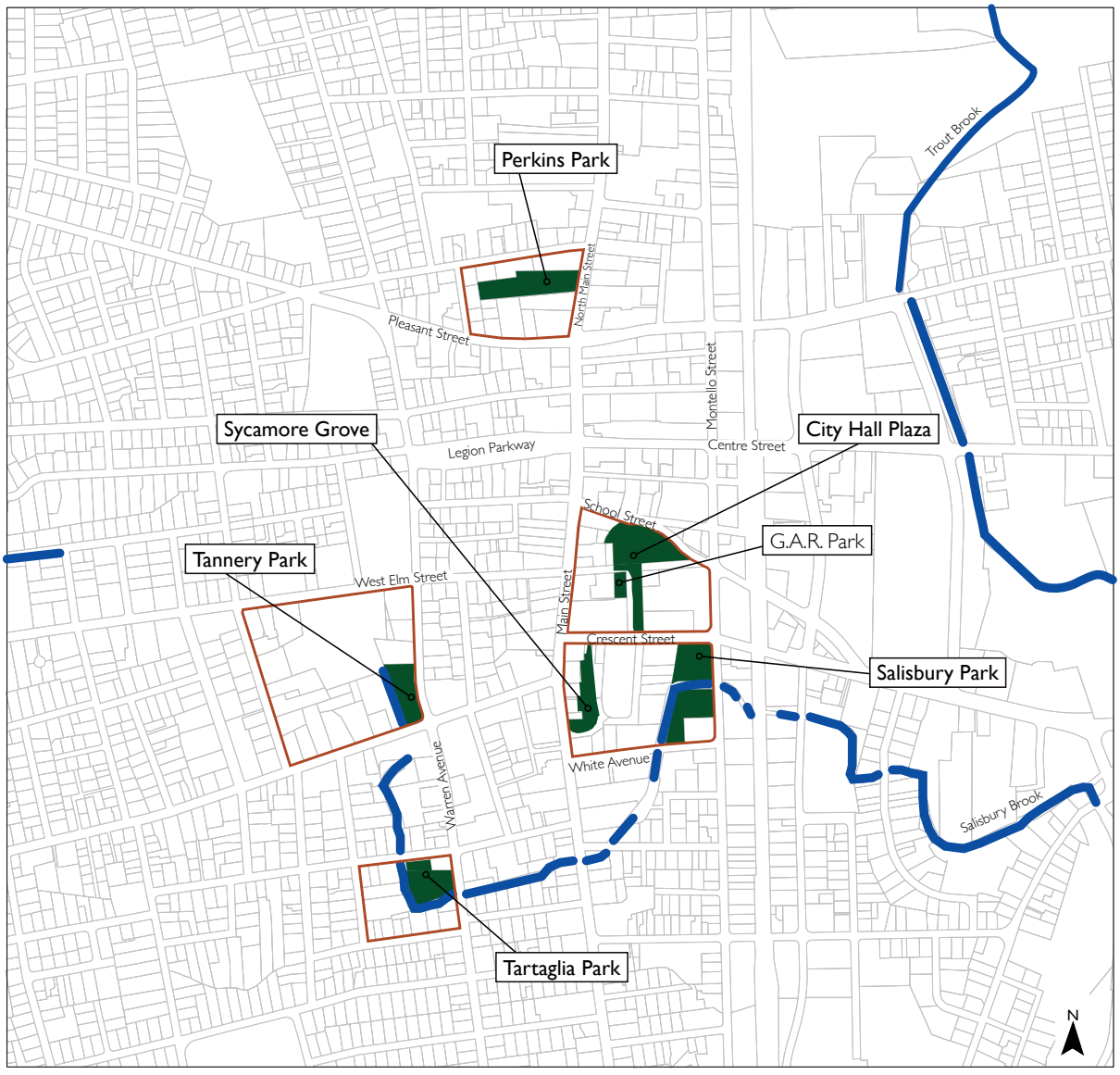
SCOPE AND GOALS

The City of Brockton's Planning and Economic Development Department has identified the improvement of green spaces downtown as a priority in the midst of redevelopment and growth. In the outreach efforts for the city's *Brockton Downtown Action Strategy*, community members identified parks and open spaces as a top priority for land use improvements downtown (40). The Planning and Economic Development Department would like to identify the opportunities and constraints of these spaces and develop strategies to improve the parks downtown.

The goal of this project is to identify opportunities to improve the connectivity, function, ecological health, and safety of Brockton's downtown green spaces, while maintaining the identity that represents Brockton's growing, diverse population.

The identified area of study is located in Brockton's downtown core. The general boundary is within the city's 40R Expansion District, as identified in the Downtown Action Strategy, and also includes the neighborhood to the southwest along Warren Avenue. The significant green spaces include: City Hall Plaza, Perkins Park, Salisbury Park, Sycamore Grove, Tannery Park, and Tartaglia Park.

The main challenges associated with the parks downtown were identified through meetings with the clients, site visits, and community meetings and surveys. Economic challenges include a lack of available funding to dedicate to park and city improvements. Social challenges include a lack of people visiting the parks and the perception of the parks being unsafe. Environmental challenges include environmental degradation to the Salisbury Brook and reoccurring flooding in the downtown.



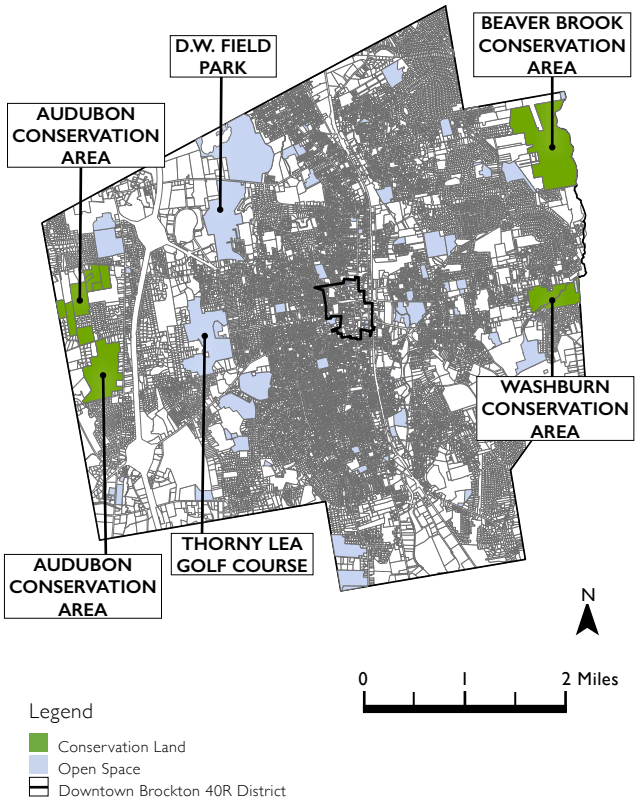
Brockton's Downtown Green Spaces

Existing Conditions and Analyses

Aerial view of Brockton shows the dense network of roads and development connecting at the center of the downtown

OPEN SPACE AND CONSERVATION LAND

Large areas of open space in Brockton are mainly located along the outer edges of the city. Within downtown, green space is limited to small, approximately one-acre sized parcels that are fragmented. Access to larger areas of open space, such as D.W. Field Park, is limited for those living in downtown.



OPEN SPACE CONSERVATION

Brockton contains several large blocks of conservation land, such as Beaver Brook Conservation Area located on its outskirts. Aside from a few privately-owned open space parcels such as the Thorny Lea Golf Club, most of downtown open space consists of small, municipally owned parcels. Green space within the City is ecologically fragmented and there are no green corridors (contiguous undeveloped tracts of land) connecting downtown green space to the larger conservation parcels on the city outskirts. Since downtown green space is ecologically disconnected from the larger parcels, it likely has little habitat value for larger mammals or forest dwelling species. However, the downtown green spaces can offer many social benefits such as event space, outdoor educational opportunities, and recreation. Additionally, these downtown parks may support many bird species, small mammals, and attractive vegetation.

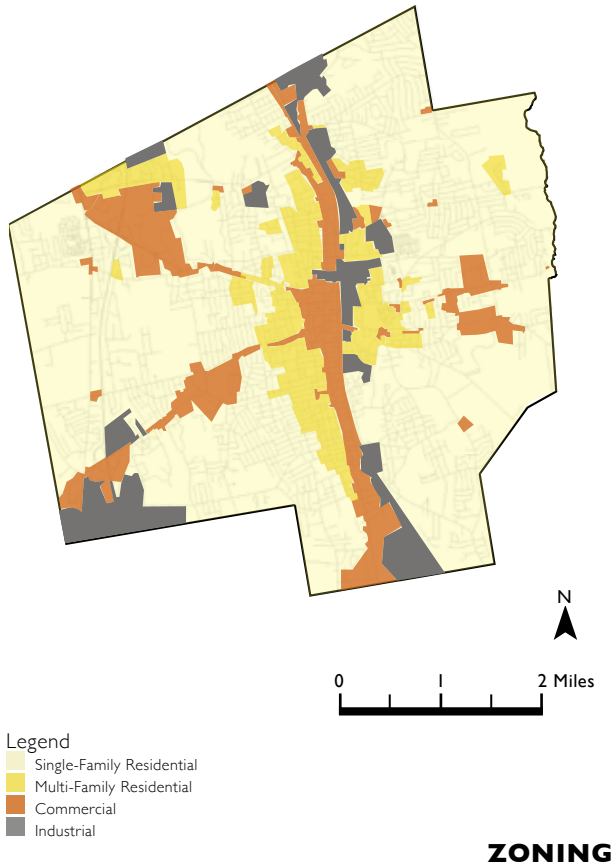
ZONING AND LAND USE

General Land Use Patterns

The City of Brockton contains a mix of residential, commercial, and industrial development. Running north to south, the main commercial district forms the spine of the city. Along the eastern side of the commercial zone and scattered in the southwest corner are industrial zoned areas, many of which contain remnants of old factories. The rest of the city is made up of residential neighborhoods with more dense multifamily housing at the core and single family homes moving outwards towards the edges of the city.

Mixed-Use Development

Mixed-use development as defined by the city ordinance is "a development project containing a multi-family residential use over at least one floor of retail, restaurant, or office use where the retail, restaurant or office use is not less than seventy (70) percent of the first floor area and provided that, in newly constructed buildings, separate and distinct building entrances are provided for residential and nonresidential uses."



ZONING

The downtown area has historically been zoned C-2 and C-3 Commercial. The C-2 General Commercial Zone allows a wide range of commercial uses and no residential use apart from temporary lodging. C-3 defines the Central Business District and permits community health centers and clinics, where C-2 does not.

The Smart Growth overlay district aims to incentivize real estate and economic development within the transit-oriented downtown core while preserving character, by permitting residential and commercial uses within the same zone, increasing density through mixed-use development, and setting building height maximums. Design standards further support the preservation and enhancement of the area's character with the goal of attracting new residents and commercial businesses.

The 40-R Smart Growth overlay district encompasses the entire downtown area. 2016 Amendments to the 2007 40-R Smart Growth Overlay District define four sub-districts within the Smart Growth Overlay District. These sub-districts include Arts/Culture, Corcoran, Downtown Core, and Perkins Park. Each sub-district is characterized by what already exists and what could be developed in each area, as identified by the city.

ZONING AND LAND USE

Three of the four sub-districts contain a park. The sub-districts have characteristics considered in the analysis of each park. Listed below is each sub-district with associated parks and major characteristics.

Downtown Core | City Hall Plaza

- Mixed commercial, office, and residential development
- Civic institutions
- Commuter rail station
- Dense, large-scale development

Corcoran | Sycamore Grove & Salisbury Park

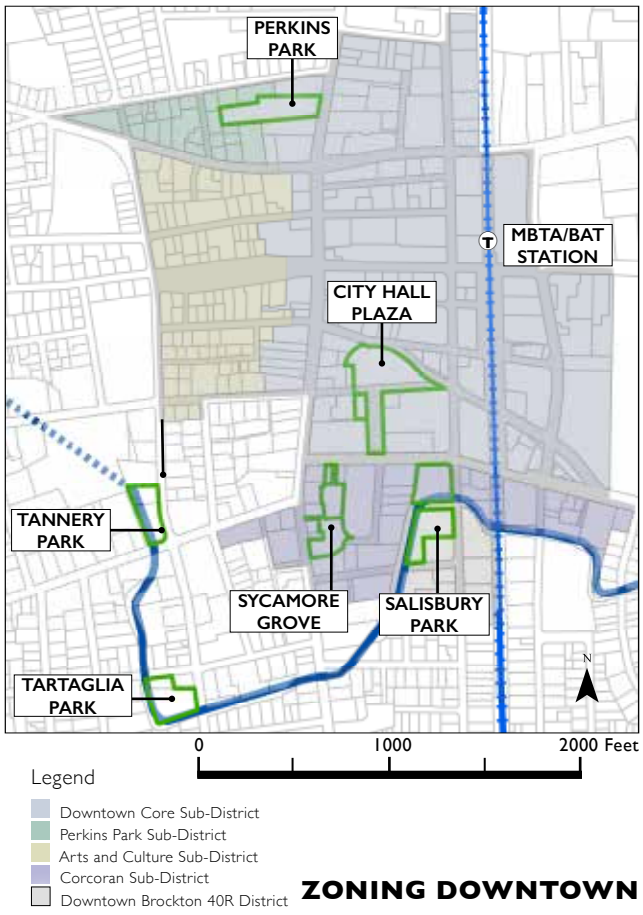
- Mixed retail and commercial development
- Public parks
- Salisbury Brook
- Public amenities

Perkins Park | Perkins Park

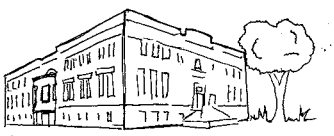
- Multifamily residential and mixed-use development
- Neighborhood feel
- Centered around Perkins Park

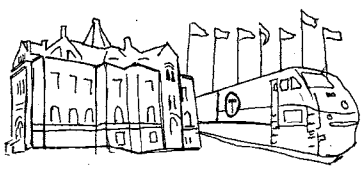
Arts and Culture | No Park within Sub-District

- Distinctive architecture
- Large pedestrian corridor
- Mixed commercial, residential development
- Cultural, arts, and entertainment zone



ZONING DOWNTOWN



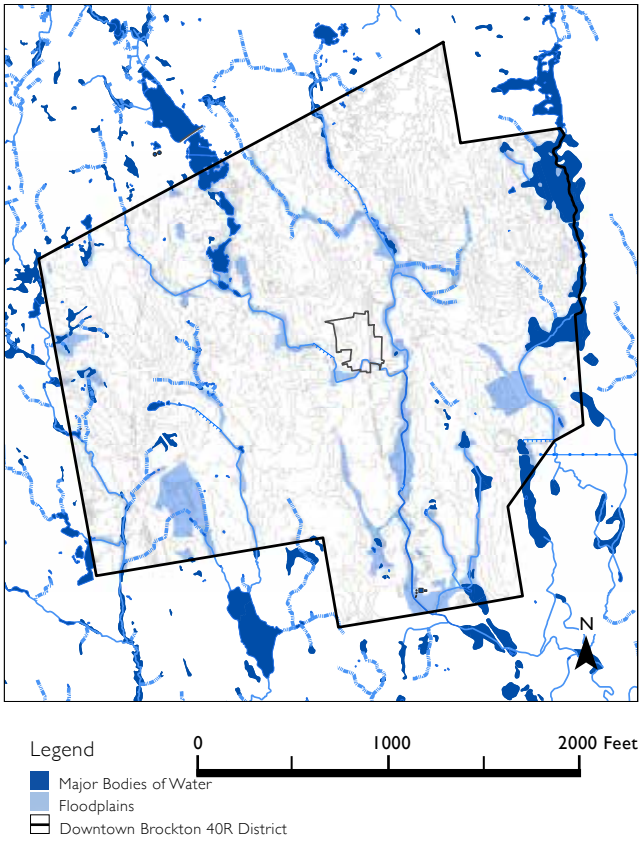


WATERWAYS

The Salisbury Plain River flows through the center of Brockton and is fed by smaller streams, including the Salisbury Brook to the northwest and the Trout Brook to the north. The brooks begin outside of the city, Salisbury in Stoughton and Trout in Holbrook. The convergence of these two brooks occurs just southeast of downtown Brockton. Salisbury Brook runs through three of the parks within the study area and is considered in relationship to the parks in the recommendations section.

Brockton was a major industrial hub in the 19th and early 20th centuries and the city and the rail line expanded along the Salisbury Plain River. The waterways were a vital resource, providing source water and a waste system for a growing industrial city. Historically, sewage and water quality were not regulated and the waterways served as a dumping ground for industrial and human waste. The pollution legacy is still felt today, as the city explores restoring and enhancing these waterways.

As Brockton developed, the waterways were extensively channelized and culverted throughout the city. Today, the brook is largely fenced off due to water quality and safety concerns. Though the waterways are fragmented and in poor health, they still provide ecological services and habitat for wildlife.



WATERWAYS

Two Rivers Master Plan: A Recreational Trail Through the City

The 2007 Two Rivers Master Plan focuses on the recreational, environmental, and cultural potential of restoring and enhancing the urban environment surrounding Brockton's waterways. The study focuses on the path of the Trout Brook to the Salisbury Plain River with one study area including the Salisbury Brook as it passes through the downtown. This report presents strategies for action and implementation for individual sites along the waterway, highlights the importance of thinking about the river system as a whole, and considers the implications that site-specific interventions may have on larger river systems. The city is working to implement recommendations made in the Two Rivers Plan; this report builds on and supports recommendations made for the downtown study area.

WATERWAYS

The Taunton Watershed

The headwaters of the Taunton watershed originate just north of Brockton along the border of Stoughton and Avon. The Brockton Reservoir, Waldo Lake, and surrounding wetlands within the D. W. Field Park make up the subbasin that feeds into the Salisbury Brook. Salisbury Brook later joins Trout Brook to form the Salisbury Plain River. The Salisbury Plain River flows into the Matfield River which is a major tributary of the Taunton River.

Since Salisbury Brook is confined by channelization and development in the downtown area, it is important to look for ways to reduce and moderate runoff within the downtown before it reaches the river. By focusing on protecting and improving hydrologic capacity upstream, and increasing the infiltration and storage capacity of the downtown area, urban flooding may be reduced and water quality improved.

Brockton sits towards the top of the Taunton Watershed

It is also important to consider what is happening downstream of Brockton. The 562 square miles of the Taunton watershed form a rich landscape of streams, rivers, outwash plains, wetlands, and kettle ponds, shaped by glaciation. Designated a "Wild and Scenic River" by the National Park Service in 2009, the Taunton River is an outstanding natural resource in the region valued for its history, recreation, biodiversity, agriculture, and fisheries. "The Taunton is perhaps the most diverse and intact coastal riverine system in all of southern New England." It is the only major coastal river in the region that is undammed. This remarkably intact river system supports over 154 species of birds, 45 species of fish, and over 360 plant species including rare and endangered species.

SavetheTaunton.org

However, the watershed does face challenges and according to the 2017 Taunton River Watershed Alliance Monitoring Study, these include:

- Excess nitrogen loading to the lower watershed and high phosphorus in ponds and upper watershed tributary streams cause excess plant and algae growth, limiting the diversity of aquatic life that can live there.
- Low stream flow, limited recreational use, exacerbated nutrient loading, and effluent domination for waters result in excessively high nutrient and treated effluent concentrations in streams.
- Unmanaged stormwater, impaired stream habitat by scour, organism flushing, and pollution loading spikes when storms occur. Potentially beneficial storm flows run quickly from impervious surfaces to streams, being wasted rather than infiltrated through soils for cleaning and groundwater base streamflow replenishment.
- Wildlife habitat and stream buffers are lost due to poorly designed and regulated development along stream corridors.

TauntonRiver.org

WATER QUALITY

MassDEP identified Salisbury Brook as a class 5 impaired waterway. A class 5 waterway has the highest level of impairment. Impairments for Salisbury Brook include:

- Floating debris and trash
- Physical substrate habitat alterations
- E. coli
- Excess algal growth
- Fecal coliform
- Sedimentation and siltation

Stormwater runoff from roads and parking lots enters Salisbury Brook untreated via surface flow and the city's stormwater mains, carrying pollutants from these surfaces. The runoff contributes to the impaired water quality in Salisbury Brook. The high levels of E. coli and fecal coliform in the brook could indicate contamination from the sewer system. Since the city is looking for ways to increase access and connection to nature in the vicinity of Salisbury Brook, the brook could be a candidate for illicit discharge assessment.

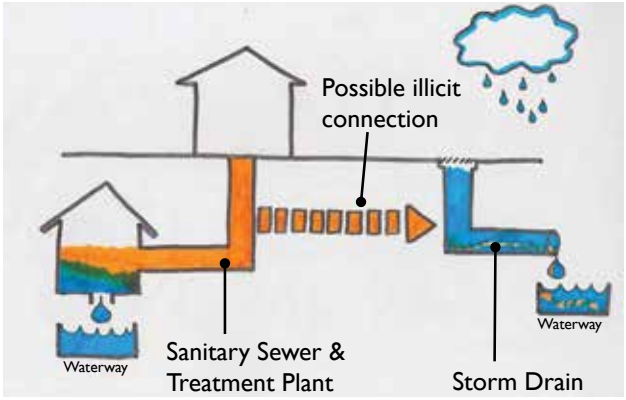
Stormwater discharge pipe along Salisbury Brook in Salisbury Park

Trash along edges of channelized area of Salisbury Brook

Illicit Discharge

The term "illicit discharge" has many meanings. The following definition is from *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments* (Brown).

- Illicit discharges are defined as a storm drain that has measurable flow during dry weather containing pollutants and/or pathogens. A storm drain with measurable flow but containing no pollutants is simply considered a discharge. 140 CFR 122.26(b)(2) defines an illicit discharge as any discharge to an MS4 that is not composed entirely of storm water, except allowable discharges pursuant to an NPDES permit, including those resulting from fire fighting activities.
- Each illicit discharge has a unique frequency, composition and mode of entry in the storm drain system.
- Illicit discharges are frequently caused when the sewage disposal system interacts with the storm drain system. A variety of monitoring techniques is used to locate and eliminate illegal sewage connections. These techniques trace sewage flows from the stream or outfall, and go back up the pipes or conveyances to reach the problem connection.
- Illicit discharges of other pollutants are produced from specific source areas and operations known as "generating sites." Knowledge about these generating sites can be helpful to locate and prevent non-sewage illicit discharges. Depending on the regulatory status of specific "generating sites," education, enforcement and other pollution prevention techniques can be used to manage this class of illicit discharges.



Illicit Connection Diagram

WATER QUALITY

National Pollutant Discharge Elimination System (NPDES) Phase II

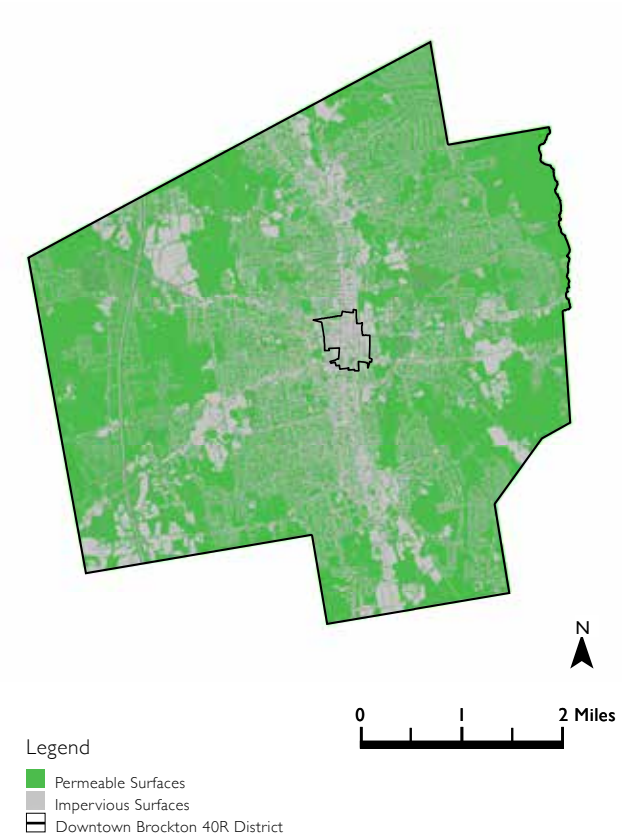
NPDES Phase II permits are required for particular operators of municipal separate storm sewer systems (MS4s) because the EPA considers these systems sources of pollution. The NPDES Phase II permit requires six minimum control measures for stormwater management. Some of the park recommendations could help the City meet NPDES Phase II Requirements.

	NPDES Phase II Minumum Control Measures	Park Recommendations
1	Public Education and Outreach	Educational signage and programming addressing stormwater and hydrologic processes along the brook.
2	Public Participation	Engaging community members in a public planning process to determine neighborhood priorities for stormwater management in and around the parks.
3	Illicit Discharge Detection and Elimination	Conduct an illicit discharge assessment on Salisbury Brook.
4	Management of Construction Site Runoff	Use construction site best management practices when installing green infrastructure in parks.
5	Management of Post Construction Site Runoff (New Development and Redevelopment)	Reduce impervious surfaces, implement rain gardens and stormwater bioretention strategies.
6	Good Housekeeping in Municipal Operations	Expand green space, improve litter management and park maintenance practices.

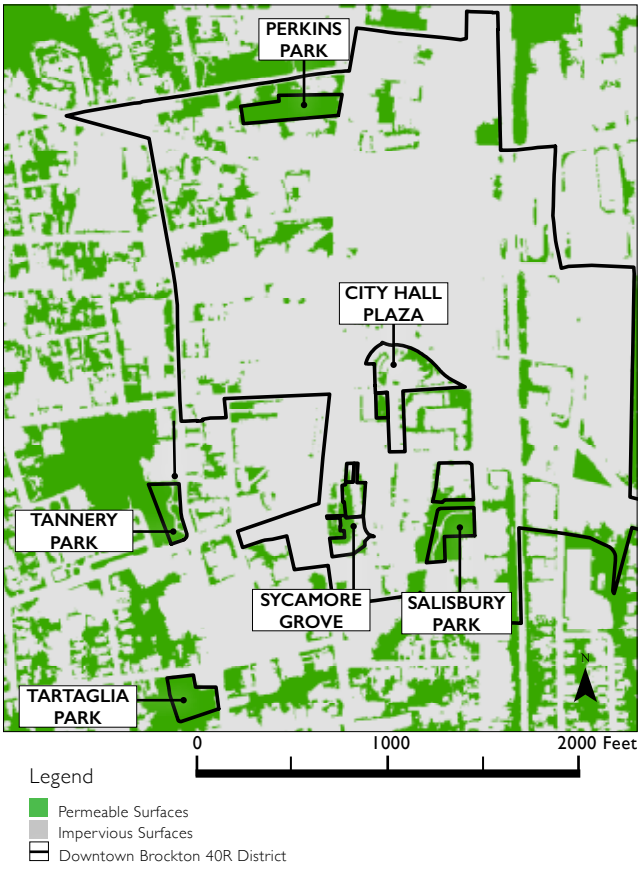
IMPERVIOUS SURFACES

Impervious surfaces cover approximately 86% of Downtown Brockton's land area (MassGIS 2005). These surfaces, such as asphalt and concrete, prevent water from infiltrating into the ground. Therefore, a significant amount of water that falls on this area either pools or runs quickly across the surface and eventually into storm drains. In urban areas like Brockton, this water picks up and carries pollutants, such as pesticides, petroleum products, and metals, into waterbodies, degrading water quality and contaminating soils.

A substantial amount of this polluted runoff is being discharged from storm drains into the Salisbury Brook, which is an impaired waterway. Brockton's history of flooding and a high water table makes reducing surface runoff incredibly valuable to the city. While it is not possible to calculate where every drop of this water will end up, there are ways of modeling the volume of the water produced when rainfall hits impervious surfaces in a variety of different weather scenarios.



IMPERVIOUS SURFACES CITY-WIDE

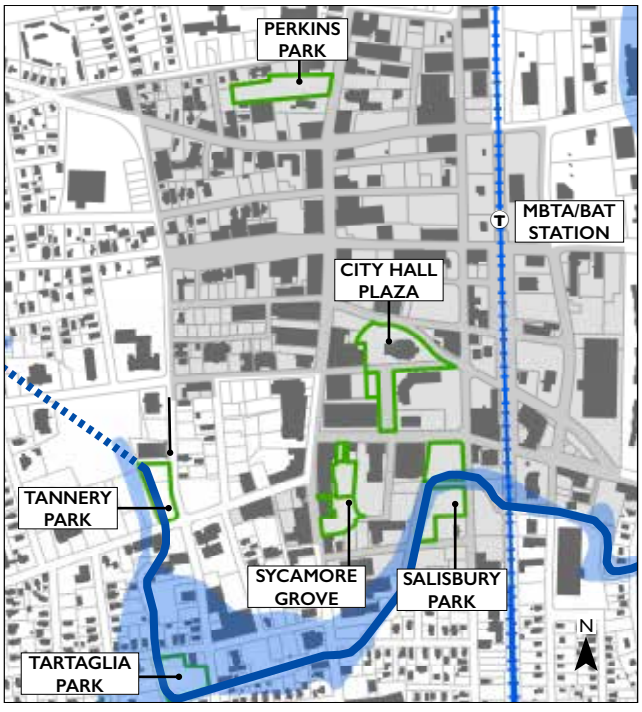


IMPERVIOUS SURFACES DOWNTOWN

FLOODING

86% of the land area in downtown Brockton, defined by the 40R Expansion District, is impervious. In addition, 40% of the city's floodplains are developed (Arbeene et al). This means that when the city experiences a severe rain event or sudden snow melt, there is very little opportunity for the water to infiltrate into the ground. Instead, water pools in roads and basements, often causing significant property damage.

In the period from 1978 to February 2014 the National Flood Insurance Program paid out $1,855,888 in flood insurance claims to residents in the city of Brockton. The city has 39 properties identified as repetitive loss properties having had two or more insurance claims over $1,000 in any rolling ten year period (Arbeene et al).



100 YEAR FLOODPLAIN

What does a high coverage of paved surfaces mean for downtown Brockton?

A small rain event can produce a substantial amount of surface runoff. In a 1 inch rain event, which is only 2% of Brockton's average annual precipitation, over 3.1 million gallons of surface runoff is produced within downtown. That's more than 4.5 Olympic sized swimming pools being filled in a single rain event. Now consider Brockton's average annual precipitation, which is about 50 inches annually. That equates to more than 156 million gallons of water in a year running off of impervious surfaces. This is a substantial amount of untreated water that contributes to flooding and enters the Salisbury Brook and eventually the Salisbury River.

It is also important to understand how valuable the remaining 14% of permeable surfaces are to downtown Brockton. If the remaining permeable and green surfaces were to be removed and replaced with impervious surfaces, such as asphalt or concrete, this would produce another 400,000 gallons of water in a 1 inch rain event within the downtown. Annually, these existing permeable surfaces in downtown may absorb 20 million gallons of water. Permeable surfaces and trees that can intercept, infiltrate, and filter water are invaluable to Brockton and can reduce flood damage and water quality impacts significantly. Therefore, it is critical for the city and other landowners to consider ways to treat and slow surface runoff and convey runoff from impervious surfaces to permeable surfaces where feasible.

Vacant Lots to Bioretention Gardens

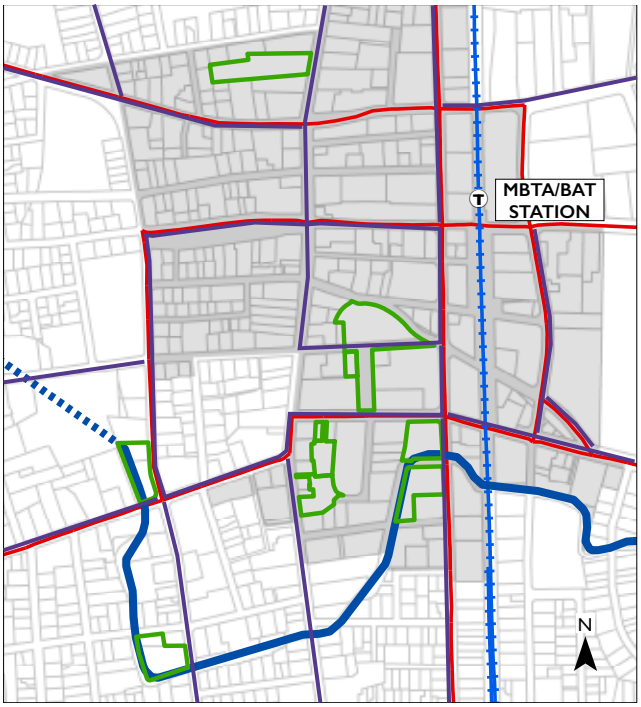
Joan Nassauer at the University of Michigan collaborates with the City of Detroit to install and test bioretention gardens on vacant lots. These gardens fill basements of demolished homes with a bioretention soil mix and "are expected to achieve an average annual stormwater volume reduction of 300,000 gallons per site" (University of Michigan). The city of Brockton might consider implementing similar systems on sites that experience routine flooding and are unsuitable for commercial or residential development. This approach treats stormwater and increases upstream storage capacity. It may be appropriate for vacant lots in and around the floodplain.

TRANSPORTATION

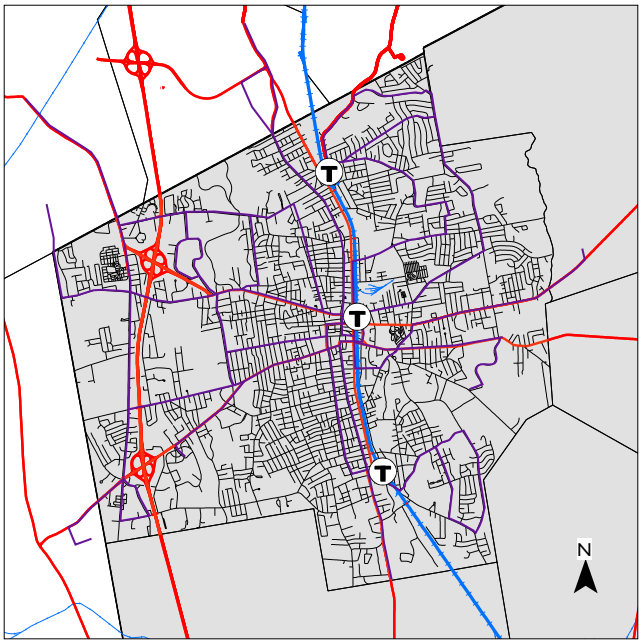
Downtown Brockton is located about twenty-five miles south of central Boston and is within the greater Boston metropolitan area. The Middleborough / Lakeville commuter rail line runs north/south through the center of the city servicing Brockton at three stations. Route 24 runs parallel to the rail line, cutting through the west side and connecting the city regionally via Route 93 to the north and Rt. 495 to the south. Dense urban development is concentrated along the rail line while suburban development and large tracts of open space exist around the perimeter of the city. Brockton has a robust public bus system and road network that radiates outward from the central downtown core connecting the city.

Pedestrian, bicycle, and universally accessible infrastructure have all been identified as needing improvements in the downtown area. Planning initiatives and changes to street and parking ordinances support the improvement and installation of multimodal transportation resources and networks.

Located in the downtown core, the Brockton Area Transit Authority (BAT) Intermodal Transportation Center (BAT Centre) serves as the commuter rail station. Downtown parks within the study area are all within a reasonable, one mile walking distance from the BAT Centre. Additionally, bus service is available on the block of each park.



TRANSPORTATION DOWNTOWN



TRANSPORTATION CITY-WIDE

HISTORICAL SITES AND SERVICES

Brockton can be described as a post-industrial New England city with a vibrant past. A number of historical sites and monuments located in downtown Brockton remind its residents of the city's development over time. Recognizable historical sites in the city include City Hall Plaza and its Civil War memorabilia; the Central Fire Station; and D.W. Field Park, designed by well known landscape architect Frederick Law Olmsted.

The majority of historical sites and monuments are located centrally in downtown Brockton, where redevelopment efforts have been planned and are underway. There is an opportunity to incorporate these historical sites and monuments into a larger pedestrian experience in the city.

Downtown Brockton has a high concentration of social services and amenities. There are healthcare, educational, legal, and recreational institutions such as the Brockton Neighborhood Health Center, the Boys and Girls Club, the library, and YMCA. There are several restaurants and other small businesses. These institutions employ and draw many potential park users to the downtown area. The city of Brockton could possibly partner with some of these institutions to further park redevelopment and maintenance goals. Additionally, strengthening the visual and pedestrian connections between downtown amenities and parks could increase park usership and bring life to these underutilized spaces.

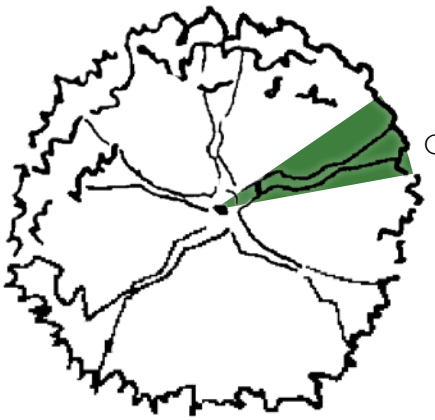
HISTORIC SITES AND SERVICES

TREE CANOPY COVER

Brockton has a city-wide tree canopy cover of about 28%. Much of this canopy exists in park and conservation land located near the city's perimeter. The downtown area only has a 7% tree canopy cover, which is not surprising given the high amount of development here. Improving tree canopy cover in the downtown could improve air quality, reduce the heat island effect, and increase building energy efficiency over the long term.

City of Brockton

Downtown Brockton



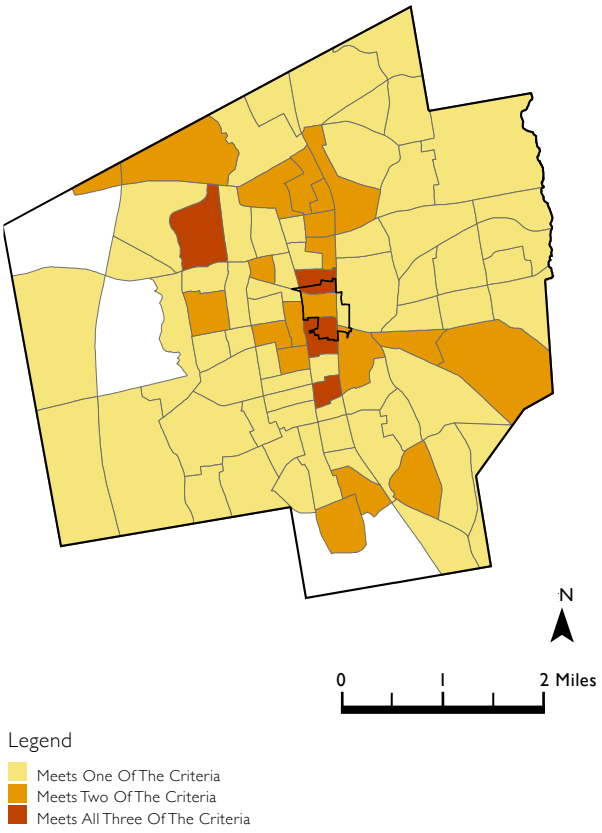
What is the ideal tree canopy cover for Brockton?

Tree canopy cover is a benchmark that helps planners and other stakeholders measure and estimate both the ecological and human health of urban areas. Though at least 40% tree canopy cover is often cited as the ideal goal for cities, there are a number of other factors at play, such as the region a city is in, existing infrastructure, and the feasibility for the city to increase and manage its number of trees. Cities today are instead working on setting individual tree canopy cover goals that support their needs and push for a greener city. For example, Boston set a goal of reaching a 49% tree canopy goal over ten years. Its baseline canopy cover was 29% as of 2006. Alternatively, New Haven set a goal to add 10,000 more trees over a period of five years (Leff 14).

The USDA Forest Service offers a step-by-step approach for identifying a tree canopy goal that meets the needs of citizens and aligns with current redevelopment initiatives (Leff). The benefits of trees can also be quantified using tools, such as the USDA Forest Service's I-TREE online application. For example, if Brockton set and achieved a 20% downtown tree canopy cover goal, these trees could sequester over 105 tons of carbon dioxide annually. Reaching this goal would also improve air quality by removing over 284 pounds of particulate matter annually.

ENVIRONMENTAL JUSTICE AND TREES

Greening the Gateway Cities Program (GGCP) is a Massachusetts state initiative run through the Department of Conservation and Recreation dedicated to providing trees for cities with comparatively low tree canopy. Gateway Cities struggled to draw new investment after the decline in industry in the 20th Century (Mass.Gov). Consequently, many of these cities face environmental justice issues and usually have low tree canopy coverage and high amounts of impervious surfaces. The Environmental Protection Agency (EPA) defines environmental justice as, "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation and enforcement of environmental laws, regulations and policies" (EPA).



ENVIRONMENTAL JUSTICE

Gateway Cities lack new investment due to socioeconomic barriers and lack of resources to redevelop and improve existing infrastructure. Many of these cities are home to underserved minority communities that have settled in these post-industrial areas that are consequently more affordable to live in. The Greening the Gateway Cities Program identified environmental justice communities as the spatial targets for where trees will be offered in these cities. The program plants trees within this boundary; 80% of new trees will be given to private residences and the other 20% to public spaces. The goal of the program is to reduce household heating and cooling energy costs by increasing tree canopy.

Downtown Brockton has been identified as a target area for the GGCP. The lowest income groups, highest minority populations, and most population-dense blocks are located in and near downtown. According to census and demographic data from 2010, 96.6% of block groups in Brockton are considered environmental justice areas. The Executive Office of Energy and Environmental Affairs in the State of Massachusetts uses three criteria for identifying environmental justice areas; percent minority population, income, and English language isolation (MassGIS 2010). The majority of downtown meets two or three of these criteria, making it a priority area for improved environmental conditions.

Greening the Gateway Cities Program Goal

In 2017, the Greening the Gateway Cities Program planted 525 trees in downtown Brockton. They are working to meet a goal of planting 2,400 trees in three years. In order to reach this goal, they need to double the number of trees planted next year.

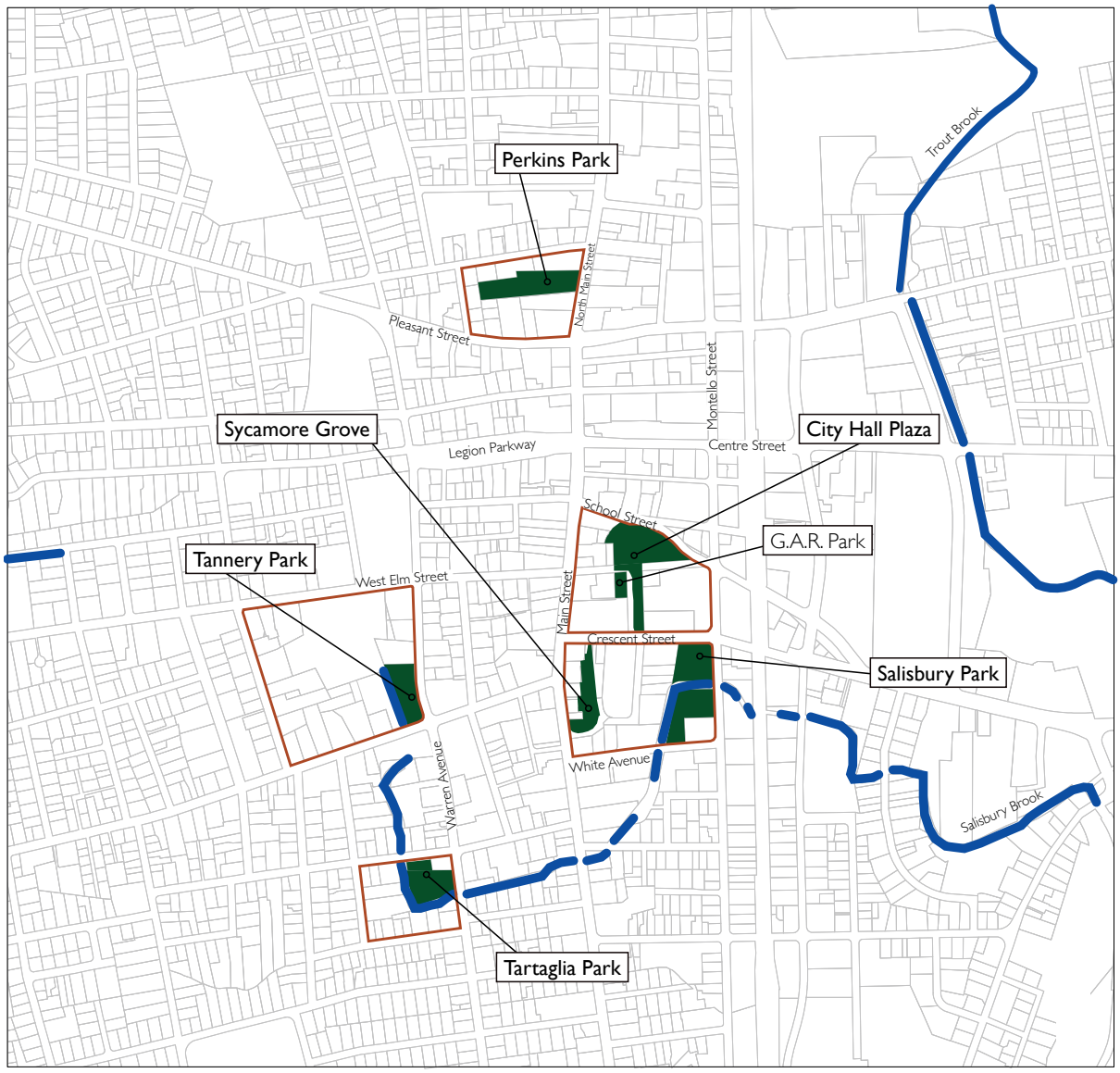
GGCP is an asset to the city and could be utilized in improving green spaces downtown. The program is scheduled to leave Brockton in the Fall of 2019, so it is important for the city and community members to maximize the services of the program.

DOWNTOWN PARKS ANALYSES

The downtown parks are each unique in their location, relation to social amenities, and physical conditions. Each has a particular set of barriers to active usership and integration with Brockton's social fabric. Each park also has a particular set of opportunities to improve its social value and ecological function. The following section focuses on the existing conditions and constraints of each park. The constraints were identified in community meetings and through brief site visits. The park recommendations section presents opportunities to increase their social and ecological functions.

Existing Green Spaces in Downtown

Downtown Brockton is scattered with parks and green spaces. These spaces range in size from under and acre to two acres and are all within walking distance from one another. The Salisbury Brook runs from the west and converges with the Trout Brook before flowing into the Salisbury River in the southeast. Many sections of the Salisbury Brook are culverted underneath the expanse of paved city surfaces. In other areas, the Salisbury Brook is channelized and fenced off for safety. In some areas, like Salisbury Park, the Brook's natural banks are exposed and vegetated. The Brook and surrounding green spaces could form a green link around the downtown core and are in a good position to be incorporated into revitalization efforts downtown.

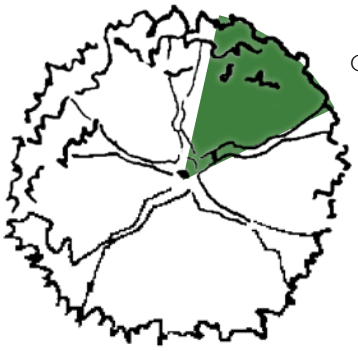

Perkins Park
Sycamore Grove
Tannery Park
City Hall Plaza
G.A.R. Park
Salisbury Park
Tartaglia Park
Trout Brook
Salisbury Brook
Pleasant Street
North Main Street
Montello Street
Legion Parkway
Centre Street
School Street
West Elm Street
Main Street
Crescent Street
White Avenue
Warren Avenue
0
625
1,250
2,500 Feet
Downtown Green Spaces
City Blocks with Green Spaces
Locations Where Brook Daylights

CITY HALL PLAZA

Existing Conditions

City Hall Plaza is approximately 3.1 acres, most of which is exposed, impervious surface. The plaza has 15% tree canopy coverage, roughly double the downtown average. It is only 0.2 miles from the T station. A paved amphitheater on the western side provides the most extensive seating of the downtown parks. G.A.R. Park on the southwestern side of the plaza provides a shaded, pocket-sized alternative seating area. The plaza is accessible from School Street on the northern boundary, as well as East Elm and Crescent Streets on the southern boundary. Paid parking is available in the lot off of Lincoln Street, and in the parking garage off Crescent. The plaza is dominated by City Hall, a Richardsonian Romanesque Revival structure designed by local architect Wesley Lyng Minor and completed in 1894. City Hall Plaza is the civic center of Brockton and provides space for public events and active programming.

City Hall Plaza



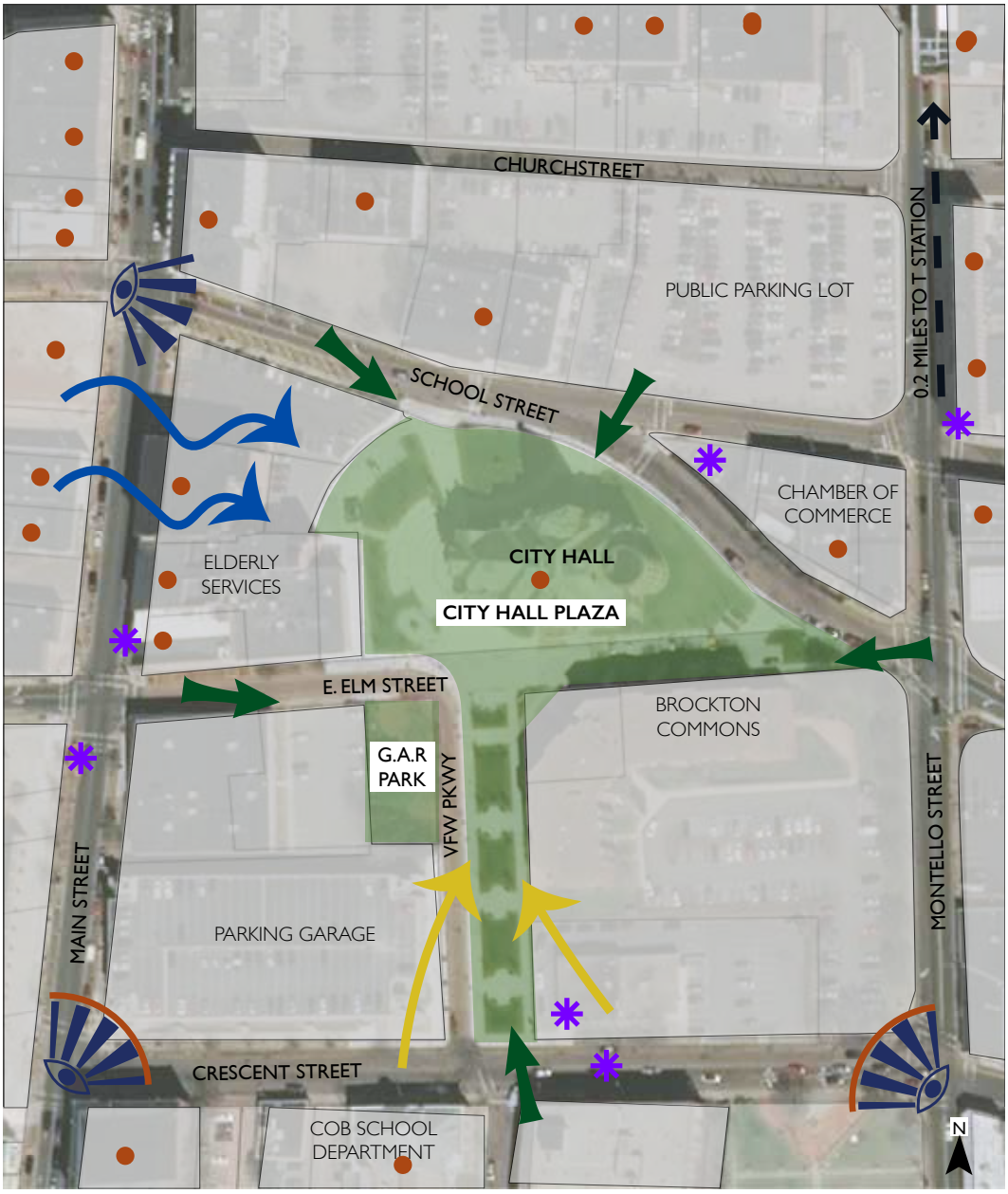
Constraints

Despite the fact that the plaza has 15% tree cover, some residents have identified the paved area as being hot in summer and windy all year. Excessive wind and sun detract from user comfort and can deter potential park users. Additionally, the plaza is visually disconnected from Main Street. While City Hall is visible from Main Street, it is impossible to see into the plaza and amphitheater. There are no signs or visual cues to lead pedestrians to the plaza from Main Street. Residents have noted that the process for reserving the plaza for events is confusing.

Aerial view of City Hall Plaza

View of City Hall Plaza from Crescent Street

CITY HALL PLAZA



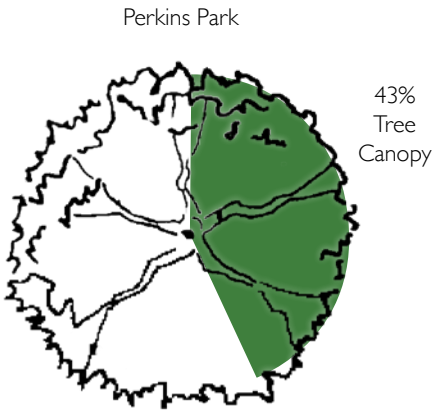
LEGEND

- Points of Access
- Clear Viewshed
- Limited Viewshed
- Wind Exposure
- Sun Exposure
- Bus Stop
- Historic Inventory

PERKINS PARK

Existing Conditions

Perkins Park is the only intentionally designed park in downtown. It is a long, narrow, 1.3-acre park with 43% tree canopy cover. It is only 0.4 miles from the T station. It is the only park in the study area with an entrance on Main Street. Mature deciduous trees shade the park which has a turf ground layer and a hardscaped path. There is no public parking for Perkins Park. Located next to the homeless shelter, the park is mainly used by the homeless population during day-time hours. Additionally, the park contains a historic memorial and drinking fountain.



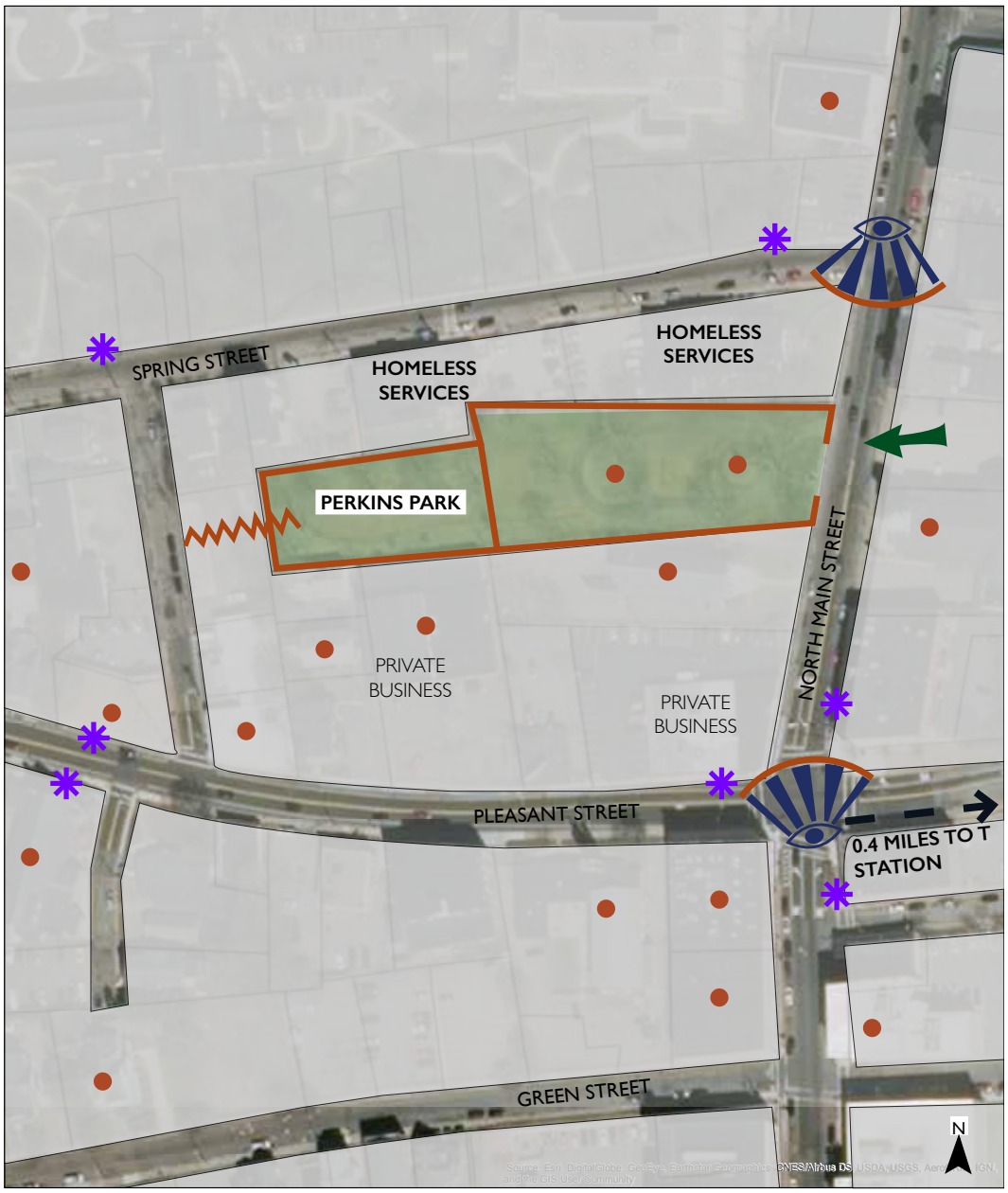
Constraints

The entrance to Perkins Park is narrow and easy to miss while driving along Main Street. Perkins lacks parking for easy vehicle access and since there is only one entrance to this long, narrow park, there is very little incentive for people to enter or walk into the park. The perimeter of the park is fenced making it less welcoming and more difficult to enter. The presence of people spending extended amounts of time in the park, who are presumably homeless, makes some people feel uncomfortable. Though this cultural issue may not be resolved though design, there may be opportunities to increase comfort and perceptions of safety in the park.

Aerial view of Perkins Park

View of Perkins Park from Main Street

PERKINS PARK



LEGEND

- Points of Access
- Clear Viewshed
- Limited Viewshed
- Areas of Disconnect
- Fence Barrier
- Bus Stop
- Historic Inventory

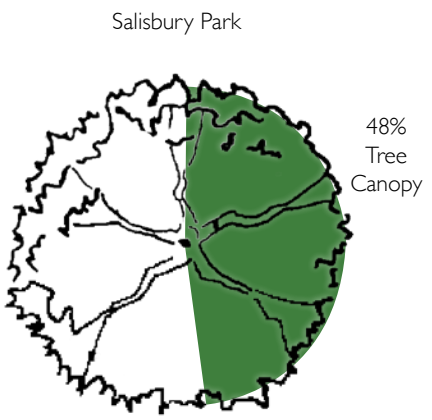
SALISBURY PARK

Existing Conditions

Salisbury Park is approximately 2.4 acres and has 48% tree canopy cover. Salisbury Brook bisects the park into two open spaces. This section of Salisbury Brook is one of the few downtown stream segments that remains unchannelized and has natural, vegetated banks. One of the few parks with public parking access, Salisbury park is also only 0.3 miles from the T station and has been identified as a more popular destination for families and day-time park users. It has several park benches and a veteran's memorial in the northern half of the park. The park has a collection of mature trees and a turf ground layer. Its close proximity to Main Street, City Hall, the library, and YMCA makes this park a potential asset for community programming.

Constraints

The park lacks clear wayfinding from Crescent and Main Street. While Maple Avenue is not supposed to be a vehicular through-way to Main Street, there is a fair amount of vehicular cut-through traffic which could come into conflict with pedestrian access to the park. There are no crosswalks connecting the park to the public parking lot on the east. The two halves of the park are isolated from each other by the brook. Views into the park from the southeast are blocked by the electric company on the corner of Montello Street and White Avenue.



Aerial view of Salisbury Park

View of Salisbury Park from White Avenue

SALISBURY PARK

LEGEND

- Points of Access
- Clear Viewshed
- Limited Viewshed
- Areas of Disconnect
- Fence Barrier
- Bus Stop
- Historic Inventory

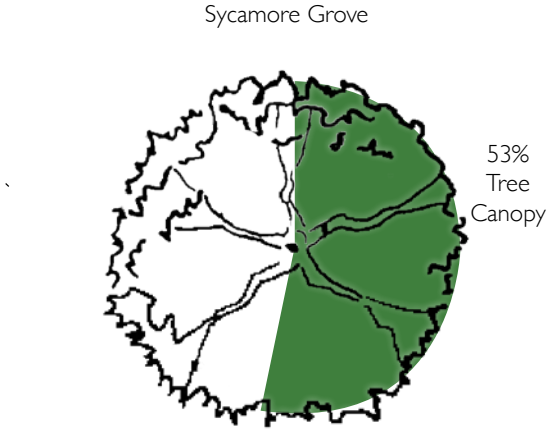
SYCAMORE GROVE

Existing Conditions

"Sycamore Grove" is not currently a park, but has been identified as a potential green space for the city. It is only 0.4 miles from the T station. It is approximately 1.25 acres and has 53% tree canopy cover, roughly seven times the downtown average. This former bus depot features a beautiful grove of mature sycamore trees and is bounded on the western side by a row of buildings and their service entries. These buildings have frontage on Main Street. The majority of Sycamore Grove is paved and currently provides some public parking space. There is no seating or park furniture and it is used as an informal cut-through from Crescent Street to the library and YMCA.

Constraints

Despite Sycamore Grove's tree canopy percentage, there is very little permeable surface or opportunity for on-site stormwater infiltration and treatment. It has weak visual connections to Crescent and Main Street and is contained by a largely blank building face. Low visibility from Main and Crescent Street and unclear wayfinding contribute to low perceptions of safety in this area. Converting Sycamore Grove to a park area will require a master plan and substantial investment.



Aerial view of Sycamore Grove

View of Sycamore Grove from Crescent Street

SYCAMORE GROVE

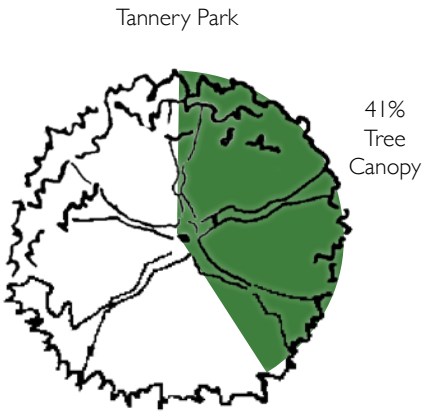
LEGEND

- Points of Access
- Clear Viewshed
- Limited Viewshed
- Areas of Disconnect
- Sun Exposure
- Bus Stop
- Historic Inventory

TANNERY PARK

Existing Conditions

This park does not have an official name. However, since it was once the site of a tannery, "Tannery Park" is used as a working name. Tannery Park is just under an acre in size and has 40% tree canopy cover. It is only 0.6 miles to the T station. This gently rolling, newly redesigned park has a winding hardscaped path and several benches. It is bordered by Salisbury Brook on the west which is channelized and lined with a chain-link fence. The park is highly visible from Warren Avenue. There is dense vegetation along the brook, which is shaded by a well-developed tree canopy. Mixed conifer and deciduous trees shade a turf ground layer. Parking is available across the street on the corner of Warren and Belmont. Sharing a block with the Arnone Elementary School and the Boys and Girls Club, Tannery Park is in a high-density kid zone, with over 1,000 kids on the block each day during the school year.



Constraints

Despite being newly redesigned, Tannery Park is seldom used. The fenced and channelized brook creates a definitive barrier between the school and the park. Tannery Park lacks a clear pedestrian connection to the school, as well as the educational programming that would make it a destination.

Aerial view of Tannery Park

View of Tannery Park from Warren Avenue

TANNERY PARK

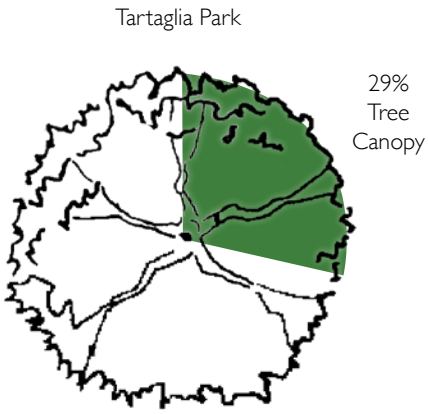
LEGEND

- Points of Access
- Clear Viewshed
- Limited Viewshed
- Fence Barrier
- Bus Stop
- Historic Inventory
- Culverted brook

TARTAGLIA PARK

Existing Conditions

Tartaglia is a 1-acre park with 29% tree canopy cover. It is only 0.7 miles from the T station. This newly remediated brownfield is bordered by Salisbury Brook to the south and west. It has a path winding from the Warren Avenue entrance to the Bartlett Street entrance, lined with several benches. There are several mature trees and a turf ground layer. Herbaceous plantings line Salisbury Brook, which has natural banks in this segment. There is no public parking near Tartaglia. The park is nestled in a residential area, one block west of Main Street.



Constraints

Development on the northeast corner of Tartaglia blocks sight-lines into the park from the intersection of Warren and Bartlett. Fencing around the park may reduce likelihood of park use (Markus) Salisbury Brook constrains access to the park from the south and the west.

Aerial view of Tartaglia Park

View of Tartaglia Park from Warren Avenue

TARTAGLIA PARK

LEGEND

- Points of Access
- Clear Viewshed
- Limited Viewshed
- Fence Barrier
- Bus Stop
- Historic Inventory

Process & Guiding Principles

The following section identifies the goals, guiding principles, community engagement process, and strategies that inform design recommendations. This framework is built around the triple bottom line, which balances social, environmental, and economic strategies. The framework meets the city's goals of improving the connectivity, function, ecological health, and safety of the downtown green spaces. It situates the goals within these three categories, so that recommendations and strategies can be leveraged in a variety of funding scenarios.

COMMUNITY ENGAGEMENT

Involving the local community in the design and decision making process is a key aspect of successful planning and development. Public engagement aims to inform residents and gain feedback that can guide and prioritize decisions made by local government on public projects. Interactive community meetings aim to educate the public about the current issues concerning their city, empower the public with knowledge to boost civic engagement, and gather critical information needed to make planning recommendations while strengthening the relationship between local government, residents, and other community stakeholders.

Public engagement took the form of two community meetings held at the downtown public library. The first meeting focused on introducing the project and getting feedback on how the downtown parks are used and perceived. The second meeting focused on identifying and applying strategies for activating each of the parks. They identified views and values associated with downtown parks.

Community Meeting One

The January 30, 2018 meeting was attended by fifteen members of the community, including the project clients. Most of those in attendance work for the City and commute to the downtown. City and state affiliations included the Greening the Gateway Cities Initiative, MassDevelopment's Transformative Development Initiative (TDI), and Brockton Farmers Market. Participants also included the owner of the Downtown Brockton Museum, a private museum located on Main Street, a representative from a neighborhood association and a local nonprofit serving the elderly, an elected residential ward representative, and long-time residents of Brockton. Members of the community worked in small groups to identify aspects of the parks that are working and not working in terms of connectivity and usership. They identified broad solutions to the issues, such as safety, and ways to capitalize on assets like community involvement.

Community Assets Identified

- A diverse population of multi-generational and new-immigrant residents.
- A transit-oriented, affordable, regional urban center within the limits of the greater Boston metropolitan area.
- A vast network of parks, recreational facilities, and conservation land that is used by residents and visitors alike.
- A rich industrial history that continues to be an asset for its cultural value.
- A robust public education system and proximity to institutions of higher learning.

Challenges Identified

- Feeling unsafe in public spaces
- Lack of human and capital resources to activate and maintain the parks
- Lack of shared sense of ownership, pride in the parks by the community
- Lack of eyes-on-the-ground to keep parks safe

COMMUNITY ENGAGEMENT

Community Meeting Two

Of those present, 40% of the participants had attended the initial public meeting. They were joined by two representatives of the garden club, as well as other members of the community. This core group discussed strategies for activating programming and usership at each of the parks in the study. After a presentation of strategies, small groups discussed and identified specific strategies that might be applied to one or two parks. At the end of the working session, a member of the community from each group reported back to the whole group.

Strategies for Activating the Parks

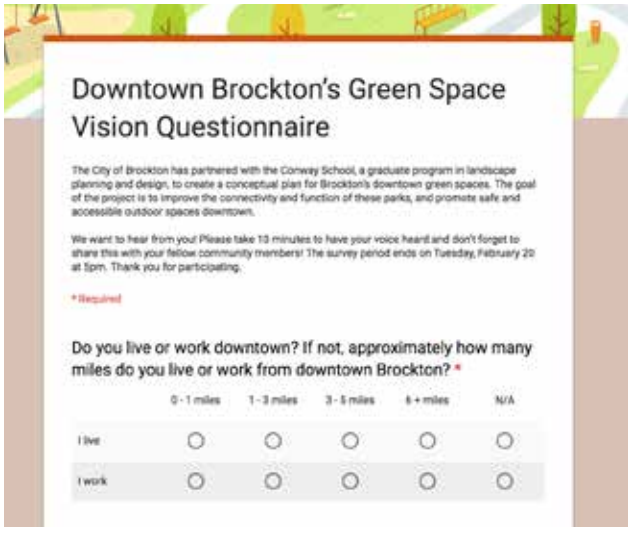
- Provide free internet access
- Incentivize healthy, active living with fitness circuits
- Provide outdoor eating areas
- Build playgrounds
- Introduce community and pollinator gardens
- Develop a public art in parks initiative
- Introduce interactive kiosks along paths
- Streamline parks permit request
- Improve permitting process to make hosting events easier

COMMUNITY ENGAGEMENT

Gaps in Engagement and Online Survey

Throughout the public engagement process, the goal of gaining the participation of downtown residents and minority ethnic groups was not met. These populations were not represented in the two public community meetings. In an effort fill this gap and gain further feedback from residents, an online public survey was released with the hope of reaching out to a more diverse pool of participants. Survey questions focused on how the community uses the downtown parks, how residents get there, what makes people feel safe, and what they value in parks. Questions were asked in reference to parks in general and specific parks within the study.

When asked about parks that they visited and how often, 70% of respondents said they never visit one or more of the parks.



Downtown Brockton's Green Space Online Survey

Survey Findings

A survey was open from January 30th to February 20th and sought information from community members about their uses and perceptions of the downtown parks. Community members who attended the community meetings, and those who did not, were both encouraged to take the survey and share it. The survey was also emailed to local community organizations, such as the Brockton Interfaith Community and the Boys and Girls Club.

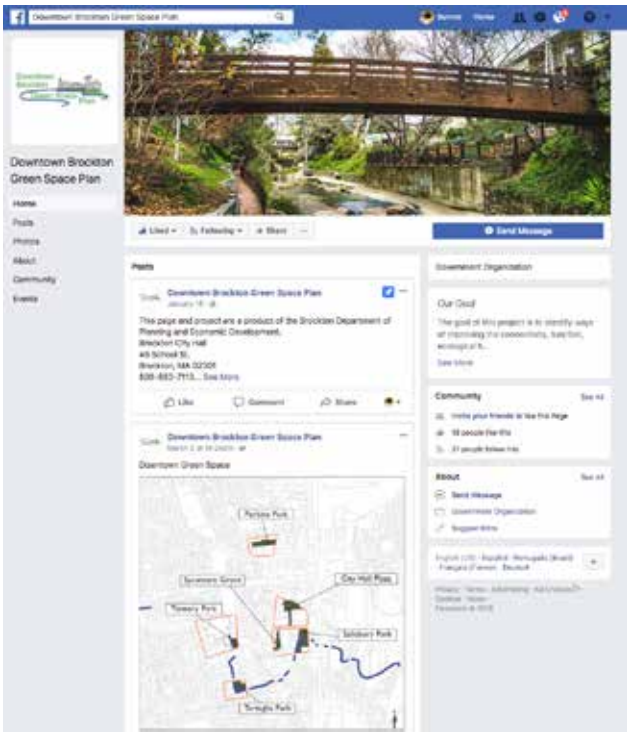
Of the 39 respondents, the majority either lived or worked near downtown Brockton. When asked about parks that they visited and how often, 70% of respondents said they never visit one or more of the parks. Perkins Park was the least visited and City Hall Plaza was the most visited out of the identified green spaces. When asked about their perceptions of the parks, all of the respondents identified one or more of the parks as unsafe, particularly Perkins Park. All of the survey respondents also identified at least one or more of the parks as lacking adequate amenities. When asked about Salisbury Brook, 36% of respondents identified it as a "natural habitat that supports habitat and wildlife". Another 36% responded that they were not at all familiar with the brook.

The survey responses identify critical issue areas and areas of limited awareness, such as the condition of Salisbury Brook. Though the sample size is limited, it is invaluable to get community feedback and identify perceptions and uses of the parks downtown.

PUBLIC ENGAGEMENT

Social Media

The Planning and Economic Development Department maintained a social media presence through the Downtown Brockton Green Space Plan Facebook page. It posted information about community meetings, project updates, and links to articles discussing urban green space.



Downtown Brockton Green Space Plan Facebook Page

Conclusion

Public engagement revealed a few overarching themes in community perceptions and possible solutions for the green spaces downtown. The most commonly identified barrier to activating public space in downtown Brockton is the perception that the parks are unsafe. This perception is often associated with inadequate lighting, existence of crime, and long-term presence of homeless individuals in these spaces. The other most recognized barrier is the lack of active recreation opportunities at these parks. Community members were eager to discuss economic and social solutions as ways of making the parks safer, thereby encouraging people to use the parks. The feedback received from the community meetings and online survey strongly influence recommendations for the downtown green spaces, though the recommendations keep in mind the gaps in engagement.

TRIPLE BOTTOM LINE AND GUIDING PRINCIPLES

Triple Bottom Line

In order to address the complexity of the city's goals for downtown parks, guiding principles have been developed in the context of the triple bottom line. The triple bottom line is defined as the ecological, social, and economic aspects of green space development. The triple bottom line establishes an ethical commitment to address all three components without improving one to the detriment of another. For example, bank remediation along the brook must also contribute to the social and economic needs of the City.

Guiding Principles

Several guiding principles underpin and guide the recommendations for the urban green space plan and inform the strategies outlined in the following section. The principles may be addressed on a site-specific level.

Ecological Principles

- Mitigate Flooding and Improve Water Quality
- Improve Air Quality, Regulate Climate, and Sequester CO2
- Increase and Improve Habitat

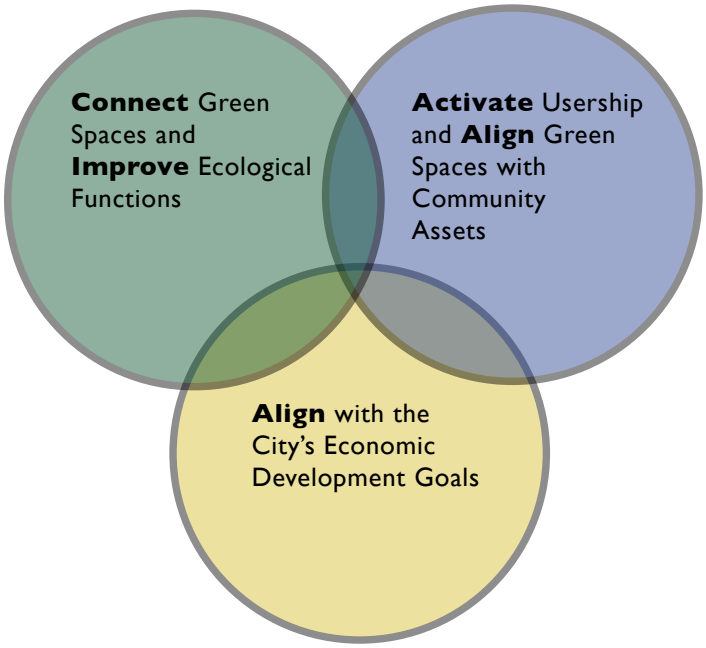
Social Principles

- Increase Usership
- Promote Outdoor Recreation
- Connect Parks to City's Assets

Economic Principles

- Align with City's Economic Development Goals
- Reduce Costs Associated with Natural Resource Impairment
- Increase Resilience in the Face of Extreme Climate Events
- Reduce Maintenance and Operations Costs

Overarching Goals



Recommendations

The goals and guiding principles provide a framework for the following recommendations. These recommendations meet the needs of the city at the town-wide scale and for individual parks within this study. Recommendations were informed by site analysis, community input, and extensive research.

The first set of recommendations is finer-grained and curates a list of site-specific strategies to improve the programming, connectivity, ecological health, and amenities of each park within this study. Individual park recommendations may be applied in combination with the town-wide design schemes or may be addressed on an individual park basis.

The second set of recommendations presents three conceptual frameworks for looking at the park system within downtown, each with a different focus on the triple bottom line. The **Blue Brook** prioritizes restoring the natural resource of the Salisbury Brook; the **Spine** strengthens existing physical and social urban infrastructure; and **Green Blocks** supports sustainable and affordable economic development. The schemes are represented through conceptual diagrams that show spatially where the social, ecological, and economic aspects of the triple bottom line may be prioritized. Each set of recommendations is presented individually, but they are not mutually exclusive of one another. Planning initiatives may combine recommendations from each of the three concepts, or align funding opportunities with an individual concept. Given that they highlight social, environmental, and economic opportunities, there is freedom for the city to leverage these strategies in a variety of different scenarios.

Planning for a robust and vibrant park system in Downtown Brockton is not just about designing safe passive and active outdoor green spaces and walkable green corridors. The planning process also requires achievable goals and an implementation processes that City departments and other stakeholders agree to follow. The City may decide on goals to develop site inventory guidelines, build private and public partnerships, create construction and maintenance guidelines, or secure funding pathways. Achieving these types of planning goals will help to ensure the long-term success of individual park revitalization projects.

Recommended planning priorities:

- Pass and implement the 2007 draft Stormwater Management Plan and Erosion and Sedimentation Control Plan Ordinance.
- Develop Green Infrastructure design and performance guidelines and standards.
- Develop site inventory guidelines and criteria for assessing existing conditions of downtown parks and streets.
- Develop city park and Green Street design standards and implementation guidelines that include construction and maintenance plans.
- Conduct Green Infrastructure cost-benefit analysis that considers environmental, social, and public health outcomes.
- Host public engagement meetings to educate and increase community buy-in.

What is Green Infrastructure?

According to the Environmental Protection Agency (EPA), Green Infrastructure is defined a strategy that use soils and vegetation to infiltrate, evapotranspirate, and/or recycle stormwater runoff by mimicking or restoring natural hydrological processes within the built environment. "When used as components of a stormwater management system, Green Infrastructure practices such as green roofs, porous pavement, rain gardens, and vegetated swales can produce a variety of environmental benefits. In addition to effectively retaining and infiltrating rainfall, these technologies can simultaneously help filter air pollutants, reduce energy demands, mitigate urban heat islands, and sequester carbon while also providing communities with aesthetic and natural resource benefits" ("Green Infrastructure").

Measuring the value of Green Infrastructure is challenging as its benefits extend beyond water management and systems are often climate region and site specific.

Resources to Address Brockton's Needs:

The Green Edge: How Commercial Property Investment in Green Infrastructure Creates Value published by The Natural Resource Defense Council in 2013 explores how green infrastructure can advance the bottom line for the commercial real estate sector.

The Value of Green Infrastructure, A Guide to Recognizing Its Economic, Environmental, and Social Benefits published by The Center for Neighborhood Technology in partnership with American Rivers outlines methods for measuring and valuing green infrastructure.

The EPA provides a suite of resources for municipalities interested in adopting Green Infrastructure (EPA.gov).

The New York City Department of Environmental Protection has developed a comprehensive set of design standards for green infrastructure practices (NYC.gov).

The Design Trust for Public Space in collaboration with the New York City Department of Parks and Recreation developed High Performance Landscape Guidelines, 21st Century Parks for NYC.

The Old Colony Planning Consult developed The Natural Hazard Mitigation Plan for the Old Colony Region, which outlines action items for flood mitigation.

PARK-SPECIFIC RECOMMENDATIONS

Park connectivity refers to physical, visual, and programmatic connections at different scales, within individual parks and between parks and their neighborhoods on the town scale. Park connectivity also refers to social connections, including partnerships between the City community to assist with maintenance or program events at the parks. This section summarizes characteristics and analyses of each park within the downtown study area, helping planners identify opportunities to improve programming, physical and social connectivity, ecological health, and amenities at each. Recommendations for each park build on strategies identified in the previous section and feedback gathered through community outreach efforts.

Activate Programming

Open space in downtown is valuable, but without amenities to support active and passive activities, these spaces, residents don't use the parks. Park usership could be increased by improving amenities and promoting park-related activities and events. The implementation of park programming could be achieved through partnerships between City departments, local organizations, private businesses, and residents already working to activate, maintain, and enhance these places.

Improve Circulation and Access

The parks downtown are each accessible by public transportation, vehicle, bicycle, or foot. It is important that pedestrian connections, such as crosswalks, sidewalks, bicycle paths, and pathways between the parks, public parking lots, and their surroundings are safe and accessible to all members of the community. Strong visual connections and infrastructure, such as wayfinding signs, street lighting, and tree-lined streets, reinforce physical connections and improve the perception of safety at these parks and along streets.

A way-fnding kiosk

Improve Ecological Functions

City parks together make up the largest area of permeable surfaces and tree canopy in downtown Brockton. These spaces provide natural areas and recreation for the Brockton community and also serve valuable ecological functions like improving air and water quality, reducing the heat island effect, offering habitat for wildlife, and improving the general quality of life for people. It is recommended that these spaces be preserved and expanded wherever possible, and their ecological functions enhanced. These interventions can take many forms, from small-scale actions, like planting shade trees in residential yards, to constructing bioswales along parking lots, remediating brownfields, and converting existing impermeable surfaces to permeable parkland.

Improve Infrastructure and Amenities

Park infrastructure and amenities such as lighting, furniture, play structures, and trash and recycling receptacles can help improve the safety, cleanliness, and use of green spaces. It is recommended that the City conduct more detailed individual park studies to assess the amenities appropriate to each park. All parks in this study might benefit from increasing lighting, wayfinding, bicycle racks, emergency call boxes, and furniture. These efforts support the general improvements mentioned earlier.

Bicycle racks

What are ecosystem services?

Ecosystem services, sometimes referred to as ecological services or goods, are benefits from natural systems that improve human health, ecological integrity, and quality of life. The EPA explains that, "These benefits underpin almost every aspect of human well-being, including our food and water, security, health, and economy" (EPA 2016). For example, trees improve air quality, reduce heating and cooling costs, and filter water. Scientists and environmental economists try to quantify these services in order to make a strong economic case for protecting and increasing natural systems.

A number of people have tried to classify ecosystem services in a number of ways. For example, the Millennium Ecosystem Assessment broke these services into the following categories: "provisioning (e.g., food and fresh water), regulating (e.g., water purification), cultural (e.g., recreation and aesthetics), and supporting (e.g., soil formation) services" (Millennium Ecosystem Assessment). The EPA has more recently developed a classification system for these services, which resulted in services being organized into 342 categories (Landers and Nahlik). These classification systems illustrate the complexities of ecosystem services. The benefits of these services are easier to categorize; the EPA has identified seven broad categories:

Clean Air

Clean and Plentiful Water

Natural Hazard Mitigation

Climate Stabilization

Recreation, Culture, and Aesthetics

Food, Fuel, and Materials

Biodiversity Conservation

Identifying ecosystem services in downtown Brockton is a critical task that will allow the City to identify areas needing improvement.

CITY HALL PLAZA RECOMMENDATIONS

City Hall Plaza: A Civic Center

City Hall Plaza has three acres of space and existing infrastructure like electricity to accommodate a variety of events, activities, and public art installations all year round. The plaza and amphitheater currently serve the seasonal farmer's market on Friday mid-mornings. Survey participants recommended that the market be expanded to support more vendors and be offered at alternate or additional times, either a weekday evening or weekend afternoon, to serve a greater number of community members. The plaza and amphitheater have the capacity to host large and more intimate public events such as arts and cultural celebrations, or tabling events, such as career fairs or City information sessions. VFW Parkway and East Elm Street provide vehicle access to support events such as food festivals, fairs games, and live music. The plaza is centrally located in the downtown and has multiple access points from School Street and from Crescent Street, supporting pedestrian traffic. A system of wayfinding and signs at each entrance point and along Main Street would increase the visibility of events. The plaza could serve as a showcase area for rotating art installations that promote and highlight Brockton's assets and events.

Recommendations

- Evaluate event permitting process to streamline scheduling events.
- Develop a maintenance agreement with the Parks Department to share clean-up responsibilities with event hosts.
- Design a system of wayfinding that allows for temporary event signs.
- Work with local arts organizations and art programs to develop public art initiative to fill the lawns along the southern extension.
- Amend regulations to support food vendors.

G.A.R. Park Recommendations

- G.A.R. Park has been identified by the City planning department as a potential site for public restrooms. These facilities could serve those attending public events on the Plaza and visitors to the park.
- Increased lighting could improve safety in the park.
- Since G.A.R. Park is located on a well-traveled pedestrian cut-through, the addition of bicycle racks would expand travel options for visitors to the park.
- The addition of a rain garden could help to treat runoff from the street and parking garage.
- Hardy, low-maintenance native perennials could add beauty, increase stormwater infiltration capacity, and increase habitat value for urban wildlife.

CITY HALL PLAZA RECOMMENDATIONS

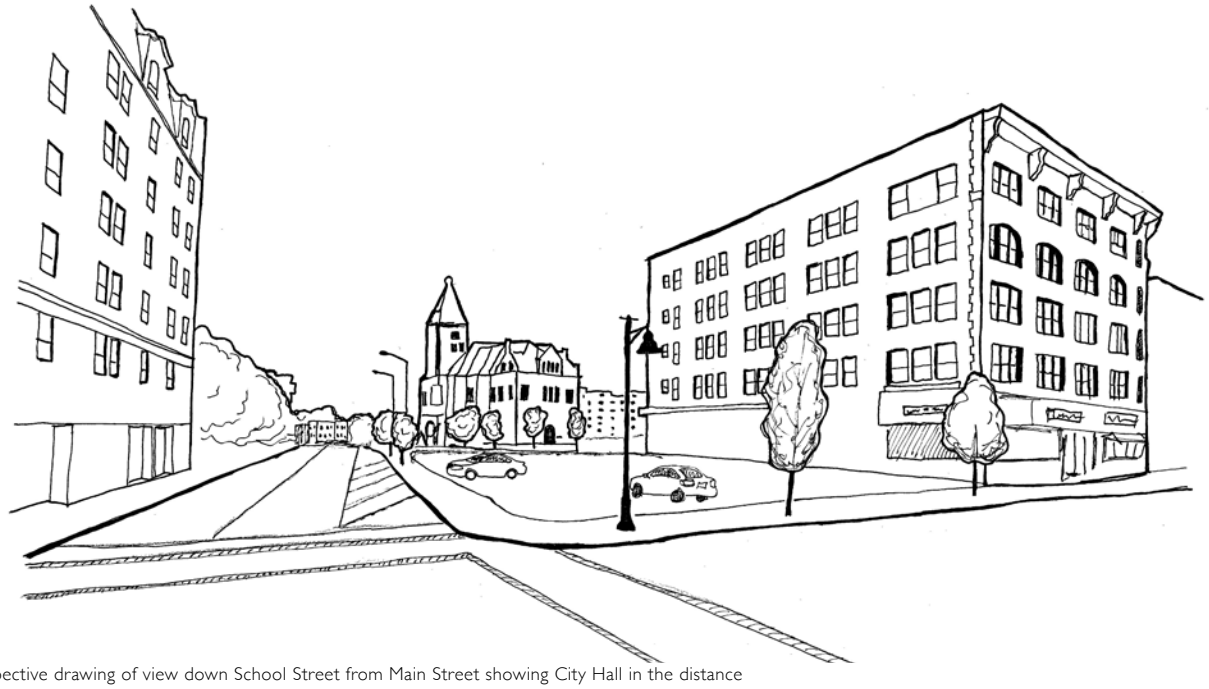
Improve Circulation and Access

City Hall Plaza is positioned centrally downtown but lacks clear pedestrian connections to the downtown arteries of Main Street, Crescent Street, and Montello Avenue. The public parking lot between Church and Lincoln Streets and a parking garage at Main and Crescent Streets provide convenient paid parking for the downtown area.

Midblock pedestrian crosswalks across School Street do not align with entrances to the parking lot or City Hall Plaza. School Street is a one-way street heading west connecting to Main Street. This approach lacks strong visual connections from Main Street. The Plaza could be made more visible from this main access point. Businesses located north of City Hall Plaza also lack midblock pedestrian crosswalks from the office buildings to the plaza. The City parking garage at end of the southern extension blocks views into the plaza. Markers defining the plaza and crossing zone would ensure safer pedestrian passage across Crescent Street.

Recommendations

- Explore the potential application of Complete Streets strategies, such as widening the sidewalk and incorporating street trees and vegetated strips along the western end of School Street to create a visual and physical connection between the plaza and Main Street.
- Consider acquiring the parking lot at Main and School Streets to expand green space and improve both views and physical connections to Main Street.
- Explore ways to concentrate two-way traffic access to the parking garage on the southern end of VFW Parkway and convert E Elm Street to limited vehicle access.
- Explore ways to connect G.A.R. Park to the plaza extension.
- Extend the Plaza through the western end of the Lincoln parking lot to connect School and Church streets.
- Act on the 2017 Downtown Parking Study recommendations to increase on-street parking along Crescent Street.



Perspective drawing of view down School Street from Main Street showing City Hall in the distance

CITY HALL PLAZA RECOMMENDATIONS

Improve Ecological Function

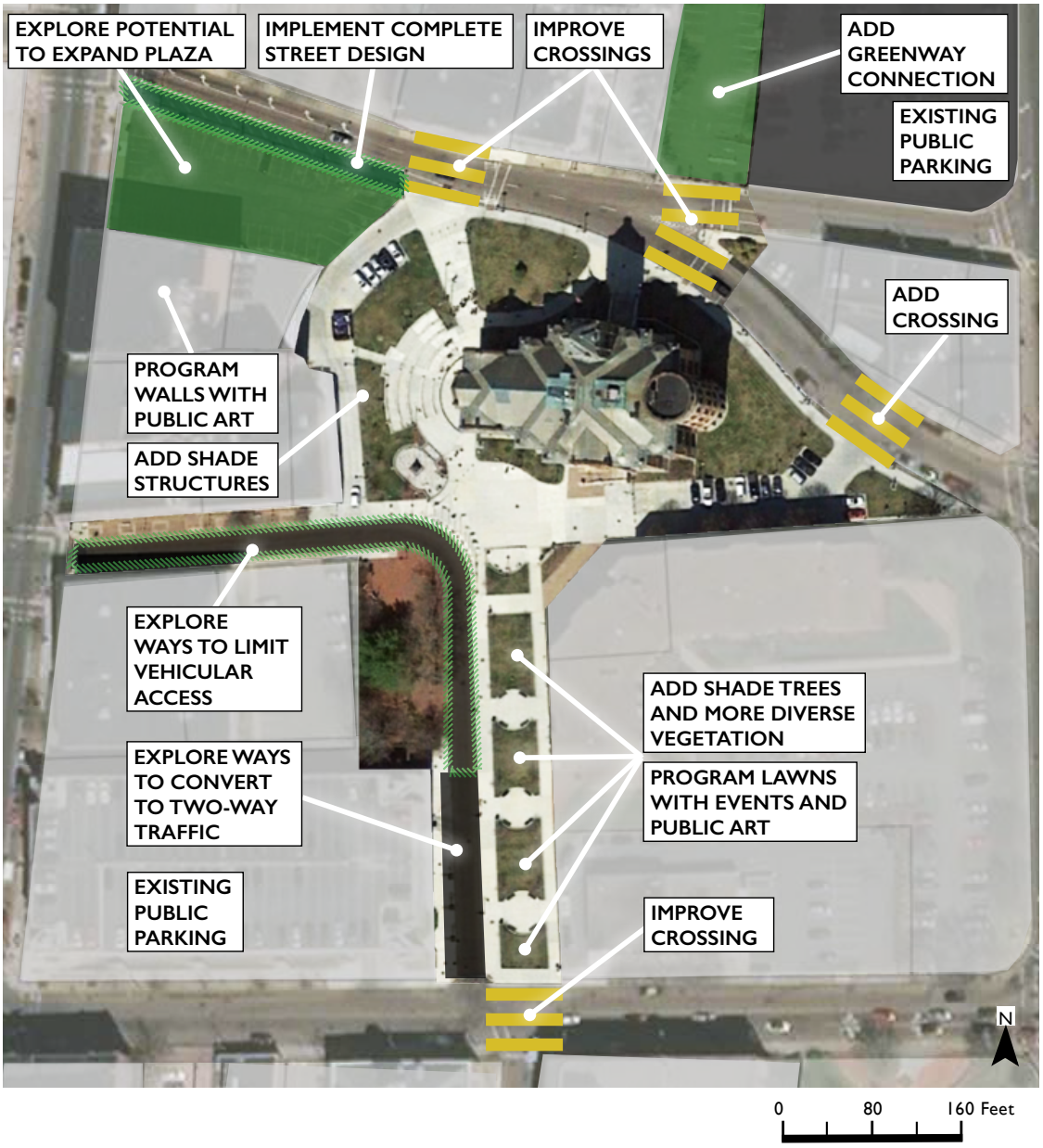
The recent redesign of City Hall Plaza is equal parts paving and turf with immature canopy trees marking edges of lawn. The amphitheater and central plaza area have been identified as uncomfortably windy year round and uncomfortably hot during the summer. Increasing the number of shade trees and understory vegetation across the entire plaza could provide relief from harsh sun and wind conditions.

Recommendations

- Replace impervious surfaces with garden beds and shade trees, or permeable pavement where feasible.
- Increase the number of shade trees within the lawn and in large planters on the plaza.
- Introduce understory vegetation (i.e. shrubs, groundcovers) under shade trees to increase habitat value and protect tree roots. This vegetation can help reduce weed pressure and the need for herbicide use.
- Implement green infrastructure strategies for stormwater management where appropriate.
- Collaborate with local designers and builders to create permanent or seasonal shade structures.
- Introduce curb cuts to direct stormwater into these areas; planting them as rain gardens could reduce the amount of stormwater runoff flowing directly into the stormwater system.

Solar panel shade structure

CITY HALL PLAZA RECOMMENDATIONS



PERKINS PARK RECOMMENDATIONS

Perkins Park: A Space In Transition

Perkins Park has a rich history, but is presently little used. Community members identified Perkins Park as unsafe and undesirable to visit. Factors contributing to this perception may include people idling or spending long periods of time in the park. Possible solutions might include redesigning the park to include differentiated spaces so that the park meets multiple user-group needs. The park's formal spatial layout and historical use as an event space is precedence for once again hosting performances. The proximity of the park to the downtown core makes it an easily accessible destination for pedestrians. Drawing people along Main Street could help support retail businesses. Additionally, neighborhood health centers in the immediate area could host events in the park that could provide health and wellness services for the homeless and other community members in need.

Recommendations

- Collaborate with local groups to develop public programming series.
- Collaborate with local healthcare partners to develop educational and service events hosted in the park.
- Collaborate with Historical Society or The Downtown Museum in the development of a Historic Trail from City Hall to Perkins Park highlighting the city's monuments and landmarks.

Improve Circulation and Access

Perkins Park is located within the middle of a developed block with its main entrance off North Main Street. Chain link fence currently encloses all but the eastern entrance and completely closes off access to the western portion of the park. The park's long layout and narrow street frontage results in poor visibility to passing vehicles. Community survey results suggest Perkins is primarily accessed by pedestrians since the park has limited street parking along Main Street and no additional adjacent parking lot. There are also no direct crosswalks in the center of the block to the entrance of the park, making safe pedestrian access a challenge. Creating through access to the park by removing fences may help to increase accessibility, help diversify the use of the park, and better connect residents north of Spring Street to commercial businesses south of Pleasant Street.

Recommendations

- Add crosswalks across Main Street for direct access from on-street parking.
- Consider the acquisition of abutting parcel on Hereford Street to provide through access and public parking.
- Assess the feasibility of adding an entrance on the western side of the park to improve accessibility and foot traffic through the park.
- Assess the feasibility of through-block pedestrian easements to the park.

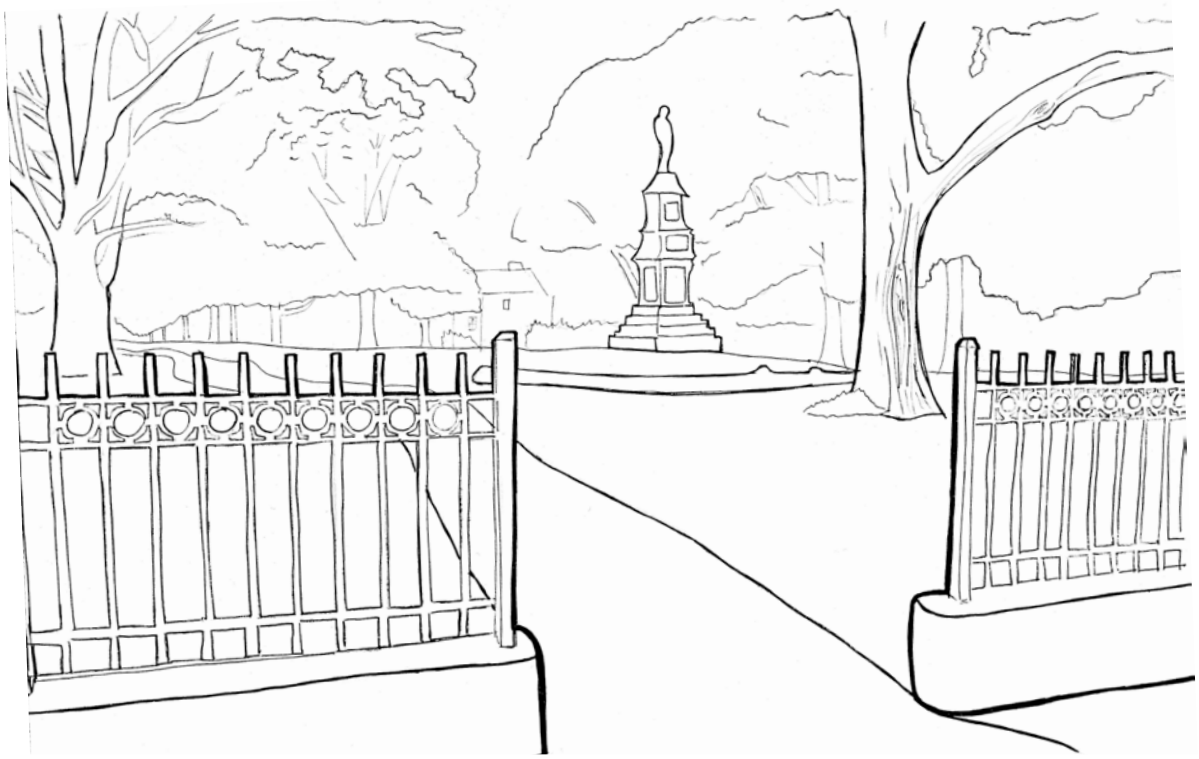
PERKINS PARK RECOMMENDATIONS

Improve Ecological Function

The beautiful, mature trees of Perkins Park provide a host of ecological services. They increase water-holding capacity of the soil, provide shade and reduce heat-island effect, and provide habitat for urban wildlife. These ecological services could be augmented by the addition of understory vegetation which would increase water retention, protect tree roots, and increase habitat. Because the park is in the center of a developed block, the roof runoff from surrounding buildings could be directed into a water catchment and storage system along the perimeter of the park. The addition of vegetation could create an attractive living barrier that could replace the chain link fence. Garden beds once occupied the northwest edge of the park and could be revived as native planting beds. Native perennials are hardy, attractive plants that require minimal maintenance. Additionally, they provide valuable habitat and forage for pollinators and wildlife.

Recommendations

- Construct and plant rain gardens along the perimeter, where feasible, to increase water-holding capacity in the park.
- Increase understory vegetation wherever possible. Use low-growing natives to preserve clear sight lines through the park and increase pollinator and wildlife habitat.
- Preserve and protect existing trees.



North Main Street entrance into Perkins Park

PERKINS PARK RECOMMENDATIONS

Why Include Plant Species Diversity?

Increasing plant diversity contributes to the aesthetic and ecological functions of gardens. Many landscape designers identify visual complexity as an important element of a successful, well-used park. Incorporating a diversified planting palette adds visual interest and can improve the aesthetic qualities of a park. Layering different species can also reduce weed pressure and maintenance needs. Additionally, diversified plantings are often more disease resistant and can provide valuable habitat for native pollinators and wildlife species.

Native plants in Chicago's Lurie Garden.

Milkweed is highly valued by many pollinator species.

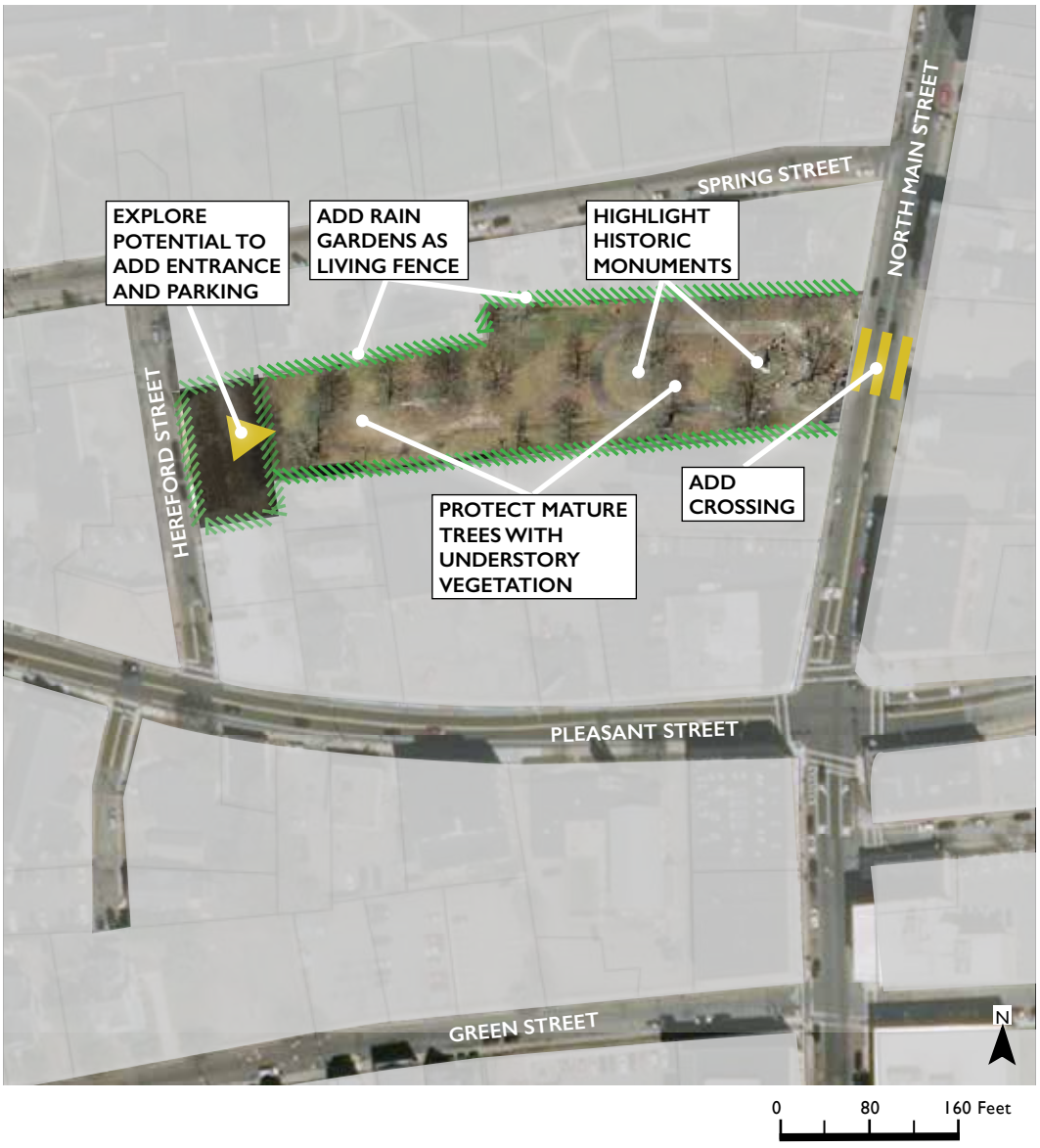
Native Gardens

Municipal gardens bring color, beauty, and life to public spaces. They are visual cues that symbolize care and investment in a community. While municipal gardens can play an important role in shaping how residents and visitors feel about a space, they face a unique set of constraints.

Municipal gardens often operate on very limited budgets and have limited resources for weeding, watering, and other forms of garden maintenance. Limited financial and personnel resources can contribute to poor garden quality and the widespread use of landscape elements such as turf and mulch.

Native perennials can offer a practical alternative to turf or the more labor-intensive annuals. Establishing perennial gardens reduces the cost associated with buying and planting annuals every year. Native plants can be aggressive in the garden, a valuable trait in a city. Some have evolved to flourish in poor soils, thrive without pesticide or fertilizer applications, and produce attractive foliage and flowers year after year. Additionally, native plants offer critical forage and habitat for pollinators and birds. Their deep root systems allow them to stabilize soils and make them ideal candidates for steep, eroding, or flood-prone areas.

PERKINS PARK RECOMMENDATIONS



SALISBURY PARK RECOMMENDATIONS

Salisbury Park: A Downtown Destination

Salisbury Park is one of the larger open spaces within the downtown, and one of the few areas along a natural bank of the Salisbury Brook. A few blocks south of the MBTA Commuter Rail station, this park has been identified in the public survey and meetings as space where families and day users spend time. Nevertheless, use is low and this park could benefit from additional amenities that support activities. Half of the northern section of the park is lawn. A line of canopy trees with understory vegetation would provide a sense of protection from the traffic along Montello Avenue, and a clearer boundary for the park. If highly frequented, highly accessible, and visible, this park with its diverse user groups could serve as a testing ground for incorporating specific activities like a fitness circuit into the downtown parks.

Recommendations

Southern Parcel

- Add amenities such as tables and benches.

Northern Parcel

- Plant a line of canopy trees and understory shrubs along the eastern perimeter of the northern parcel to define the edge of the park.
- Add additional benches near northern entrance along stone walls.
- Increase vegetation along stone wall to create a better sense of enclosure and provide shade for seating.

Park-wide

- Implement a pilot project to test outdoor fitness equipment.
- Assess an acquisition of 285 White Avenue in order to expand the park.

Improve Circulation and Access

The Salisbury Brook divides this park into north and south sections. Salisbury Park is accessible from many different entrance points but lacks clearly defined crosswalks and wayfinding to these entrances from the surrounding roads. There is no pedestrian bridge connecting the north and south sections of the park, so users must exit the park and walk along Montello Street. A pedestrian bridge links the southern section of the park to the public parking lot on the west side. A public parking lot across Montello Street provides an additional 60 spaces, but there is no crosswalk at the park's entrance. Salisbury Park's natural features, its location within the downtown, combined with ample public parking, create an attractive and accessible downtown destination that could benefit from improved pedestrian connections.

Recommendations

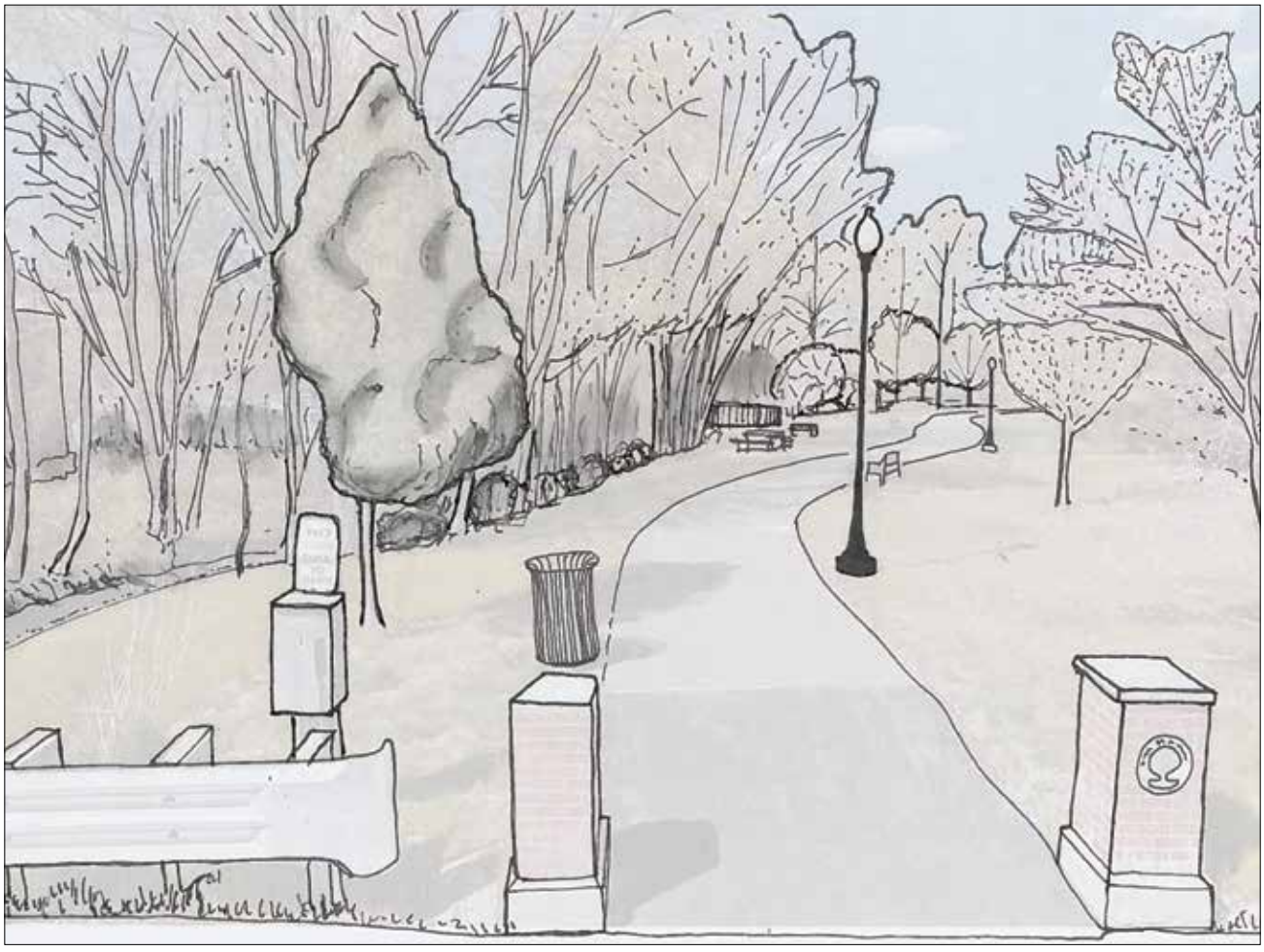
- Build a pedestrian bridge over the brook to connect the north and south sections of the park.
- Create a crosswalk at the Montello Street park entrance.
- Repaint the crosswalk at White Avenue park entrance.
- Better define the western pedestrian bridge entrance to the park with clearer signs and a redesign of the parking spaces.

SALISBURY PARK RECOMMENDATIONS

Urban Outdoor Gyms

Urban outdoor gyms have been widely implemented across Europe and Asia and have been successfully introduced to the U.S. in recent years (Attwood). Outdoor gym equipment can offer engaging, accessible exercise opportunities for those who cannot afford gym membership or feel uncomfortable using a traditional gym. Sometimes located near children's play equipment, outdoor gyms may help to increase park appeal and encourage physical activity for a wide range of user groups.

Outdoor gym equipment creates opportunities for user-activation.



Southern entrance of Salisbury Park

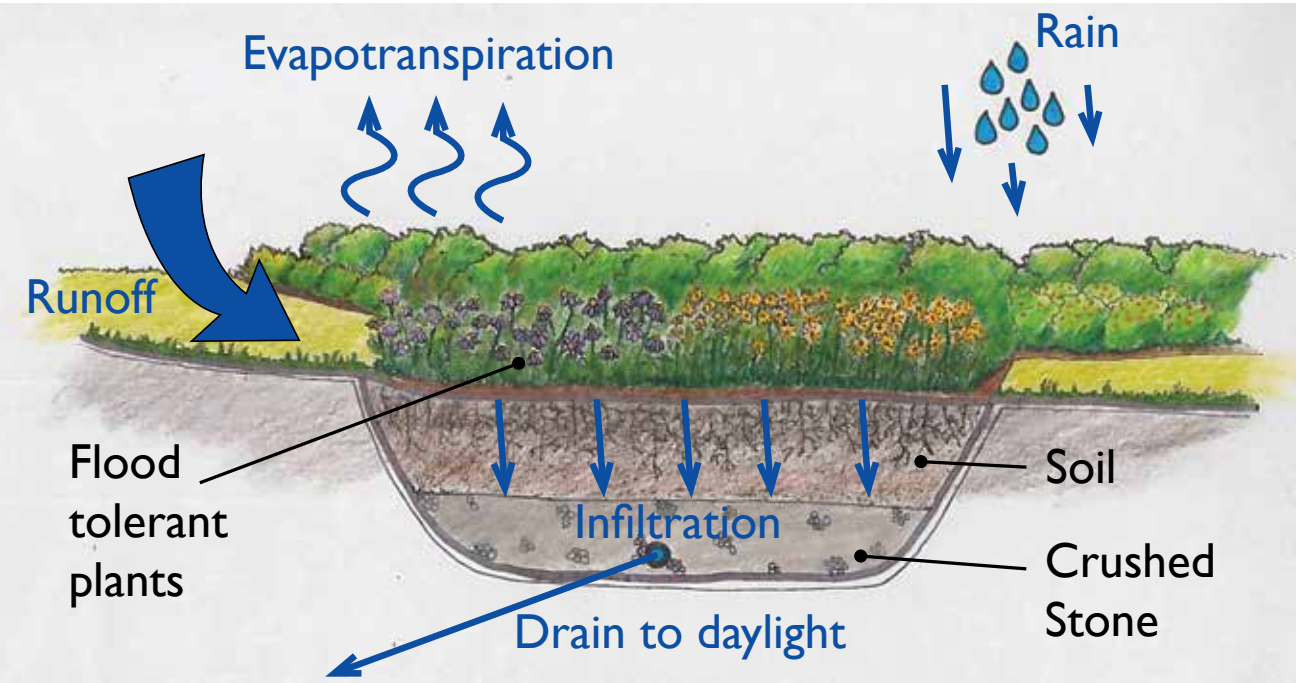
SALISBURY PARK RECOMMENDATIONS

Improve Ecological Function

Salisbury Park contains one of the largest unchannelized segments of Salisbury Brook, and its natural banks are shaded by a dense canopy of mature trees. With this combination of mature trees and natural banks, Salisbury Park already provides the city with increased water-holding capacity, air filtration, carbon sequestration, and wildlife habitat compared to the other parks in the study. These services can be protected and augmented. Bioswales could be constructed to increase water-holding and treatment capacity in targeted areas along parking lots or roads. Diversifying the vegetation along the banks of Salisbury Brook would stabilize soils and help to filter surface runoff before it reaches the brook. Pollinator gardens or other native vegetation could be added to areas of lawn to increase pollinator and wildlife habitat, increase water-holding capacity, and increase aesthetic appeal.

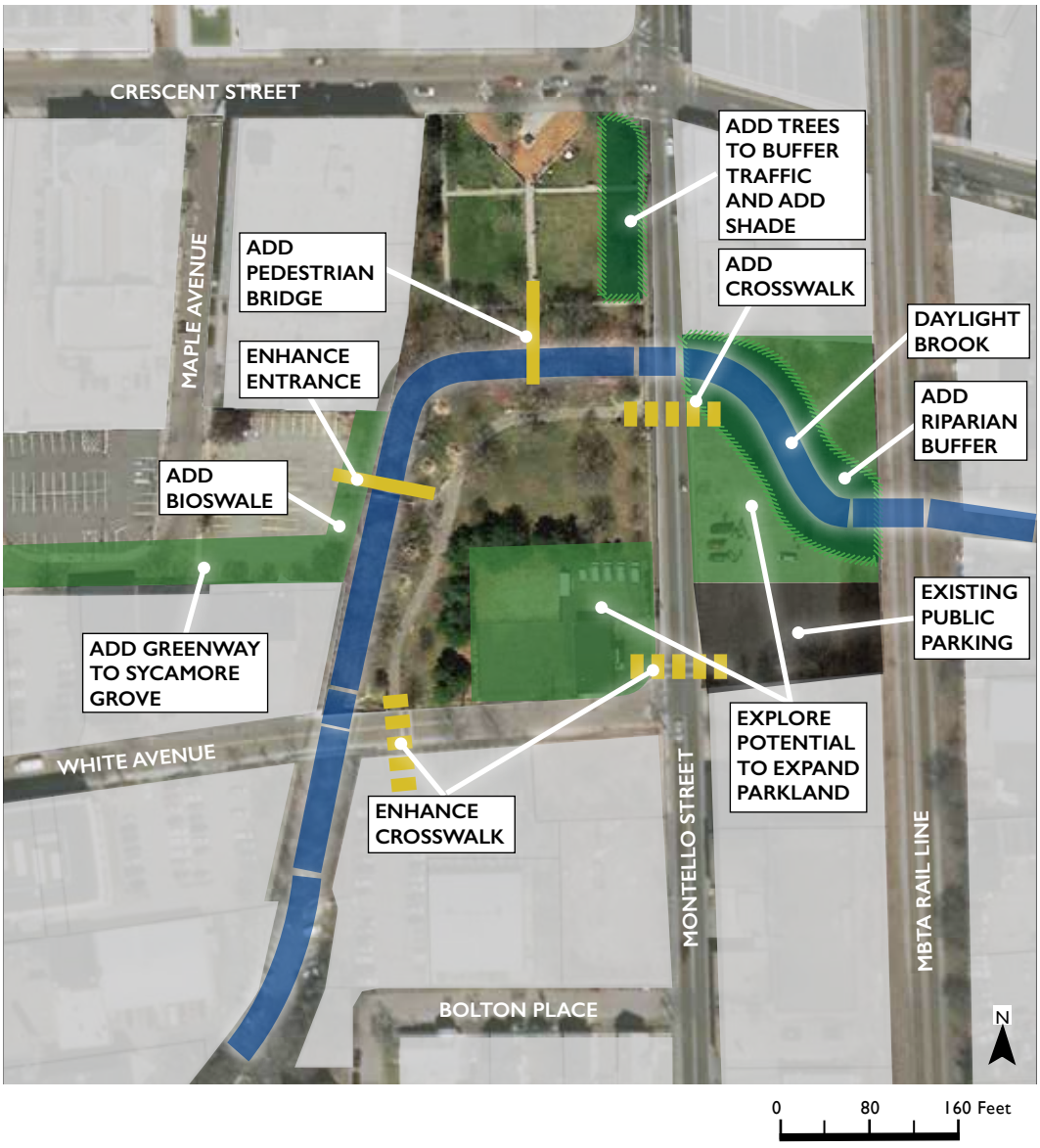
Recommendations

- Protect and plant the banks of the brook with an understory of native plants to stabilize slopes and reduce sedimentation.
- Protect existing trees.
- Implement catchment and infiltration systems where appropriate to increase water-holding capacity and to treat stormwater before it reaches the brook.
- Introduce meadow or native vegetation where possible.



Rain garden detail

SALISBURY PARK RECOMMENDATIONS



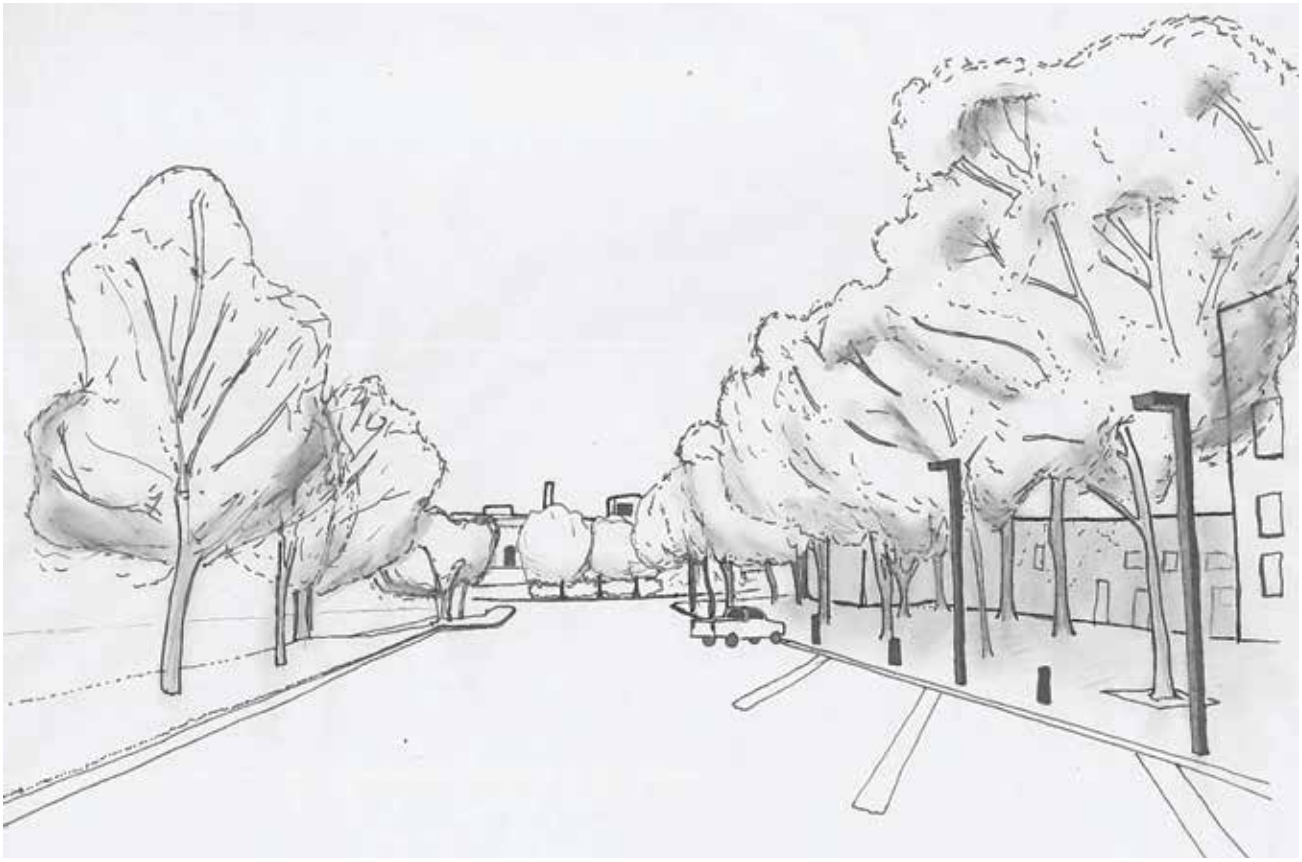
SYCAMORE GROVE RECOMMENDATIONS

Sycamore Grove: A Downtown Plaza

The wide paved plaza of Sycamore Grove is flanked by buildings and their service entrances on the west. This former bus depot could become a lively outdoor dining area given its proximity to Main Street and downtown restaurants. Community members at both public meetings envisioned Sycamore Grove as a gateway to the downtown. The area is also wide enough to support additional programming along the eastern edge. Vendors, food trucks, or pop-up markets could fill this customizable space. The alleyway connecting Sycamore Grove to Main street offers a pedestrian entrance in the middle of the block. The walls provide an opportunity for public art mural programming. The grove is near Salisbury Park and may offer an opportunity to coordinate larger programming events.

Recommendations

- Amend zoning to support outdoor dining.
- Develop a shared service, waste, and access plan for restaurants.
- Explore the potential to create a gateway arch off Main Street.
- Improve lighting along the alleyway passage.
- Work with local arts organizations and art programs to develop public mural art initiatives.



View of Salisbury Grove from Crescent Street

SYCAMORE GROVE RECOMMENDATIONS

Improve Circulation and Access

Sycamore Grove was designed as a parking lot for buses. It connects Crescent Street to Main Street. Completely covered with interlocking pavers, wide, long parking stalls designed for buses are still outlined in the paving. Though converted to metered and permit parking, the width of the roadway and the historically marked paving creates a confusing space for pedestrians and vehicles. A mid-block alleyway connects the plaza to Main Street, providing an intimate pedestrian passage. The four access points to the Salisbury Grove provide many options for redesign and/or reprogramming of this area.

Recommendations

- Assess current and projected parking and traffic needs of surrounding area.
- Study the feasibility of redesigning site as a limited access vehicle plaza.
- Restrict the east/west arm of Maple Avenue to pedestrian only access linking Salisbury Park to Sycamore Grove and Main Street.
- Create pedestrian right-of-way to provide access from Maple Avenue to White Avenue.
- Reconfigure Brockton Department of Schools parking lot to better accommodate pedestrian cut-through traffic.

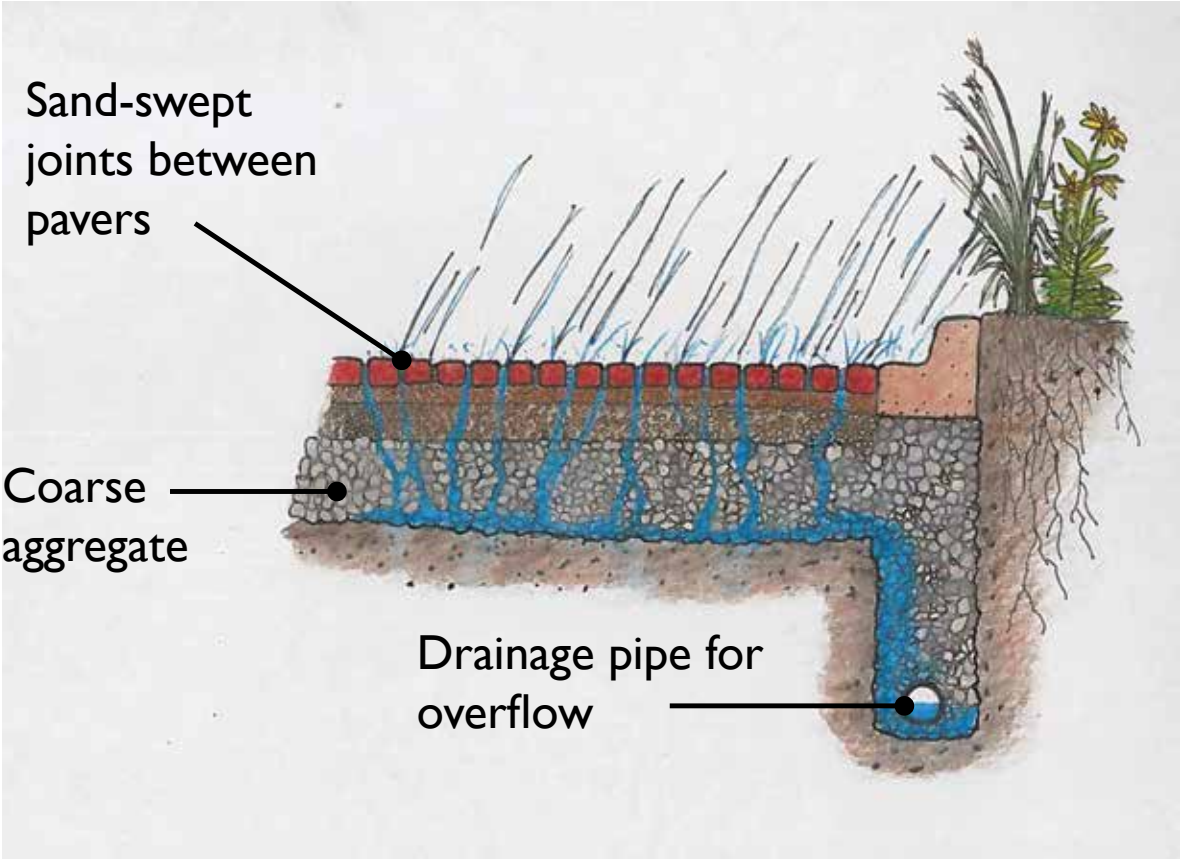
SYCAMORE GROVE RECOMMENDATIONS

Improve Ecological Function

Sycamore Grove is completely hardscaped except for a row of mature sycamore trees on the western edge. Reprogramming and redesigning this area provides many opportunities for increasing the infiltration capacity of the site. Shade trees, rain gardens, and stormwater planters can delineate the edges, create a defining character, and create a more absorbent landscape that allows water to infiltrate and reduces direct runoff into Salisbury Brook.

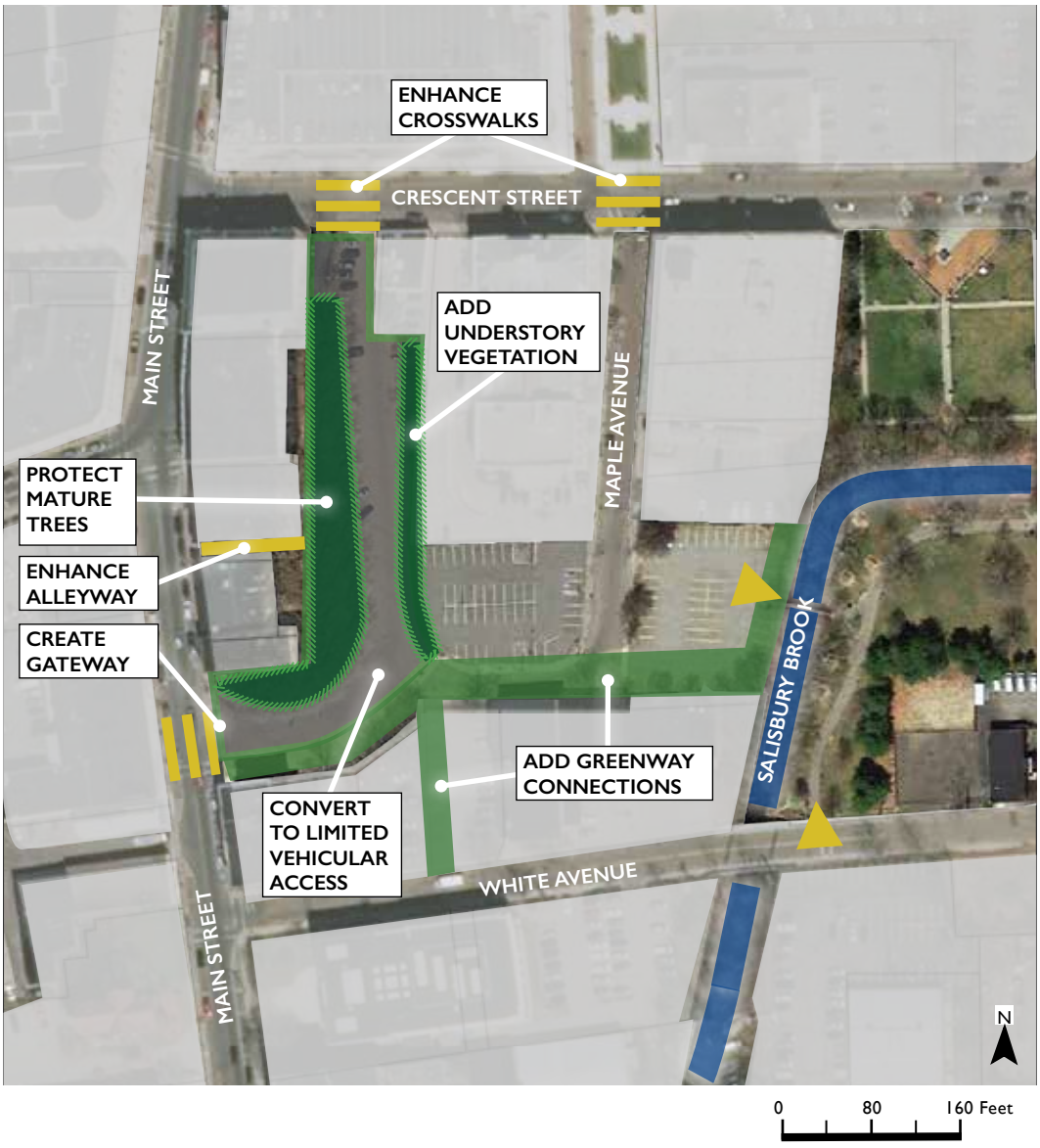
Recommendations

- Reduce hardscape where possible and replace with permeable pavers or garden beds.
- Diversify tree canopy across site to increase disease resilience and protect existing trees.
- Incorporate green infrastructure, such as permeable pavers, to capture and infiltrate surface runoff.
- Explore ways to enhance connections to Salisbury Park, the library, and Main Street through vegetation or green infrastructure.



Permeable pavement detail

SYCAMORE GROVE RECOMMENDATIONS



TANNERY PARK RECOMMENDATIONS

Tannery Park: An Educational Opportunity

Tannery Park is located on a corner lot at the intersection of Warren Avenue and Belmont Street between the Arnone Elementary School and the Boys and Girls Club. Nestled between these two children's institutions and bordering a section of the Salisbury Brook, this shaded park is an optimal location for environmental educational programming. Young people could learn about water systems science, pollinator habitat, and gardening with native plant species. Planting beds could run along the southern edge of the Eldon B. Keith Playing Field, reinforcing the path connecting the school to the northern entrance of the park and the Boys and Girls Club.

Recommendations

- Support an outdoor educational program in collaboration with the Arnone School Science and Art Programs, the Boys and Girls Club, and other primary education schools.
- Work with students to develop environmental educational signs about the brook's historical and environmental significance.
- Provide additional amenities to support outdoor learning like tables with integrated seating and outdoor education games.
- Provide additional amenities to support adults supervising kids (shaded seating, game tables, etc.).

Improve Circulation and Access

Access to public parking is an asset for Tannery Park. A public parking lot across Warren Avenue provides ample parking for park visitors. The park's topography mimics undulating hills with paved meandering paths providing four access points to Warren Avenue. Park paths are punctuated with benches and street lights and clearly defined by raised curbs. Tannery Park provides a functional link to important children's destinations including the Boys and Girls Club, the Arnone Elementary School, and the Eldon B. Keith Playing Field. The narrow path connecting these entities runs along the northern border of the park. This path is not clearly marked from either end and on the north side is bordered by a chain link fence. Safely located in the interior of the block away from traffic, the pedestrian passageway could be enhanced with vegetation, signs, and lighting.

Recommendations

- Introduce signs indicating the pedestrian path between the park and school.
- Use vegetation to frame the entrance.
- Improve the visibility of path from Warren Avenue.
- Use vegetation along the northern border to enhance the pedestrian experience.
- The chain link fence could be replaced with a lower barrier that would allow adults and children to safely observe the brook.

TANNERY PARK RECOMMENDATIONS

Improve Ecological Function

Tannery Park is bordered by a channelized segment of Salisbury Brook. Directly upstream, the brook is buried under the Eldon B. Keith Playing Field. The edges of the channel are shaded by dense tree canopy. Introducing native understory vegetation would provide additional habitat and create a more diverse landscape. Since Tannery Park is an educational opportunity, it is important to make its ecological functions visible. The vertical concrete walls of the channelized brook present safety concerns, the brook is enclosed by a chain-link fence. The City might consider replacing the chain link fence with a lower and more attractive barrier that would allow children and adults to observe the brook. The addition of pollinator, edible, and/or native gardens could offer additional habitat and educational opportunities for the neighboring schools and children's organizations.

Recommendations

- Increase plant species diversity and habitat in the form of understory planting.
- Implement perennial pollinator, edible, and/or native gardens as educational tools.
- Replace chain link fencing with more appealing, architectural fencing.

Monarch butterfly

How are cities making pollinator gardens educational?

Many cities are supporting urban ecology by installing pollinator gardens on public property. Pollinators, such as bees, support flowering plants and food systems. Between 75 and 95% of all flowering plant species on earth (Ollerton, Winfree, and Tarrant) and more than 1,200 crops grown for human use rely on pollinators (Klein et. al). Some cities convert unused or underutilized space into gardens and offer educational programming and signs. For example, Vancouver, Canada, turned an empty industrial lot into a pop-up pollinator garden dedicated to hosting bees. This garden is a temporary use of the lot before the City converts the whole block into a park. In the meantime, the City incorporated an educational element: a vibrant mural painted on the walls of the neighboring industrial buildings alerts the community of the garden's purpose (Makowski). Great Barrington, Massachusetts, and Portland, Maine, are both investing in city-wide pollinator plans and gardens. The cities are exploring educational signs and demonstration gardens that can be shared with the public and provide ways that homeowners can implement pollinator gardens themselves. The Massachusetts Department of Agricultural Resources developed a pollinator plan that identifies action items for the state to protect pollinators. One of these items is to "create and distribute pollinator kits to K-12 classrooms for promoting and educating about the importance of pollinators" (Mass.Gov Pollinator Plan 25).

Pollinator gardens are sometimes perceived as messy and difficult to manage, when in fact they can be colorful and require little maintenance. Many native plant species require very little water and upkeep. Flowering species can also be chosen to offer color throughout the year. Chicago's 3.5-acre Lurie Garden includes plant palettes that create living art year-round, while also supporting pollinators. Gardens like this one are shifting the paradigm of beauty in gardens and putting emphasis on their ecological functions.

TANNERY PARK RECOMMENDATIONS

Citizen Science and Urban Birds

The Cornell Lab of Ornithology has an ongoing citizen science program that tracks birds in urban areas to better understand how various species interact with urban environments. The program, Celebrate Urban Birds, provides community resources for identifying birds and recording bird sightings, as well as mini-grants for community events that integrate arts, gardening, and urban birds. This program might be helpful for community members or schools looking for opportunities to connect with the wildlife in downtown Brockton.

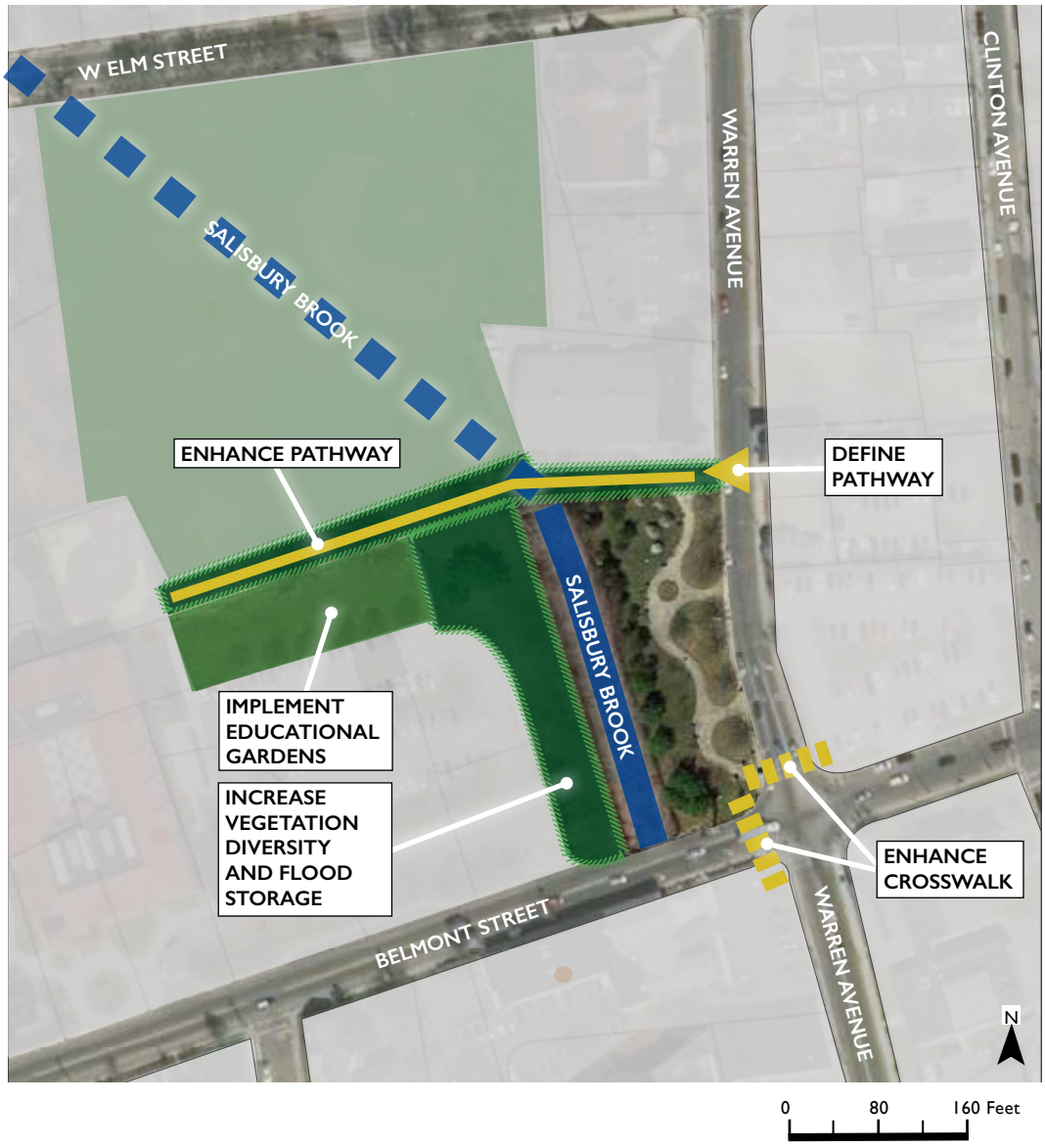
Urban Mammals

Many small mammals adapt well to urban environments. Raccoons, foxes, coyotes, rabbits, squirrels, and chipmunks may make their homes in urban areas. Most species will coexist peacefully with the human residents of urban areas. In many cases, they remain virtually invisible to the public eye. Urban green spaces provide these creatures with critical forage and shelter. Increasing plant diversity on the park level through bioswales or other vegetation increases the opportunities for urban wildlife to find food and shelter without coming into conflict with humans.

Wild turkeys have been spotted in downtown Brockton.

Urban parks provide habitat for small mammals.

TANNERY PARK RECOMMENDATIONS



TARTAGLIA PARK RECOMMENDATIONS

Tartaglia Park: A Neighborhood Park

Tartaglia Park is the former site of Rasco Industries. This new park was completed in the summer of 2017. Tartaglia Park is still relatively underused. However, the park is located on a major thoroughfare and nestled in a densely zoned neighborhood and its location is an asset for increasing park use. Tartaglia Park currently has a few benches under park lighting. Its small size, shaded open area, and location just outside downtown commercial activity makes it practical for a variety of events and activities. It could benefit from additional furniture to support a variety of uses such as private parties, tabling events, and fund-raisers. Its open space would support outdoor fitness equipment and a playground. The park's history as a brownfield site in a floodplain provides an opportunity to educate the public about the environmental benefits of converting the site to parkland.

Recommendations

- Conduct a user survey to gain insight into the ways the park is being used in its first year and better identify specific amenity needs.
- Provide additional amenities, like tables with integrated seating and barbeques, based on survey to support family-oriented events.
- Implement a pilot project to test outdoor fitness equipment.

Improve Circulation and Access

Tartaglia Park wraps around a corner parcel with entrances off Warren Avenue and Bartlett Street. Paved paths with benches and street lights run parallel to the park perimeter, leaving most of the area open lawn. Difficult to see from Bartlett Street due to development on the northeastern corner, this park could benefit from improved signage and wayfinding. Expansion of the park to include the corner parcel would greatly increase visibility and anchor the park within the neighborhood block.

Recommendations

- Assess the feasibility of relocating the business at 383 Warren Avenue in order to expand park services, expand green space, and improve visibility.
- Explore ways to improve the visibility of main entrances with signs, wayfinding, and vegetation.

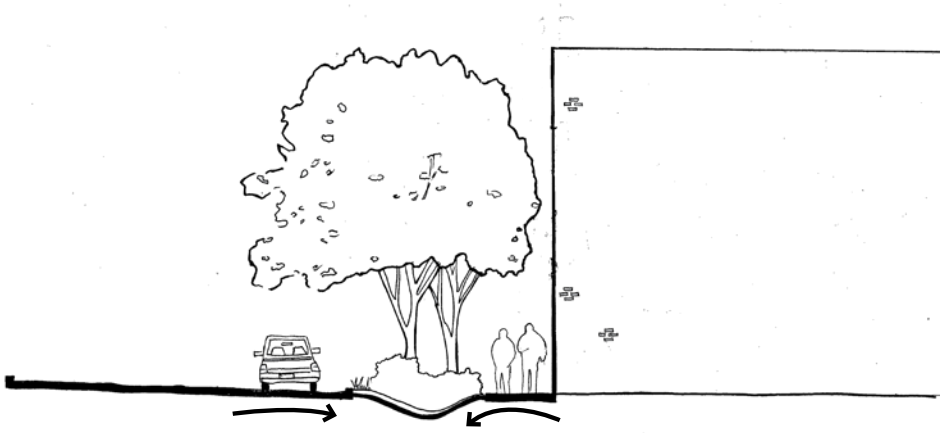
TARTAGLIA PARK RECOMMENDATIONS

Improve Ecological Function

Tartaglia Park is a successfully remediated industrial brownfield site within the 100-year floodplain of Salisbury Brook. The transformation of this parcel indicates an investment by the City to remove pollutants, address environmental hazards, and mitigate flooding. This area now provides significant infiltration and water-storage capacity for the city. Mature trees and understory vegetation along the brook also work to improve air quality and provide habitat for urban wildlife. These ecological services can be further augmented by implementing bioswales along the roads. Stormwater retention and detention could be improved directly upstream by the acquisition and protection of parcels adjacent to the stream and the conversion of the City-owned parking lot to the north to permeable surface. These parcels also lie within the hundred-year floodplain and may be unsuitable for commercial or residential development. The City might consider developing this area as a park or green space and implement measures to increase its flood storage capacity.

Recommendations

- Create a vegetated buffer along the banks of the brook.
- Implement catchment and infiltration systems along Warren Avenue and Bartlett Street.
- Look into opportunities to acquire parcels adjacent to the brook and City-owned parking lot in order to expand green space and improve stormwater storage capacity.
- Consider the conversion the western half of 278-333 Warren Avenue parking lot to green space.



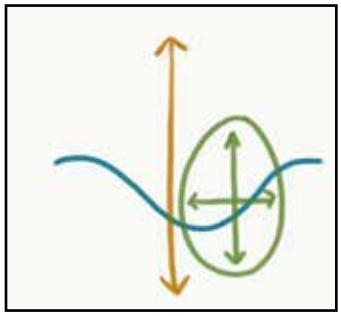
A vegetated bioswale captures runoff from the street and sidewalk

TARTAGLIA PARK RECOMMENDATIONS

DOWNTOWN RECOMMENDATION CONCEPTS

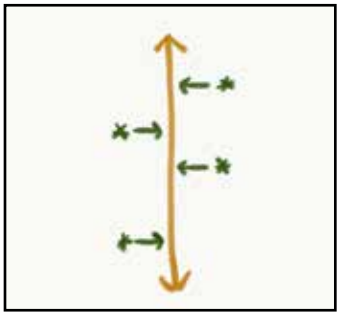
Three conceptual frameworks look at the parks system within downtown, each with a different focus on the triple bottom line.

Blue Brook



Connect Green Spaces and **Improve** Ecological Functions

Spine



Activate Usership and **Align** Green Spaces with Community Assets

Green Blocks

Align with the City's Economic Development Goals

THE BLUE BROOK

Overview

The Blue Brook recommendations below focus on the areas immediately adjacent to Salisbury Brook. The recommendations are environmentally focused and are tailored to address flooding, water quality, air quality, and urban wildlife habitat.

Manage Stormwater

In order to mitigate flooding and improve water quality in the brook, the recommendations below focus on:

- Increasing filtration capacity of the landscape adjacent to Salisbury Brook
- Increasing stormwater storage capacity of landscape adjacent to Salisbury Brook
- Reducing surface runoff flowing into Salisbury Brook and city storm drains
- Controlling erosion of natural banked segments of Salisbury Brook

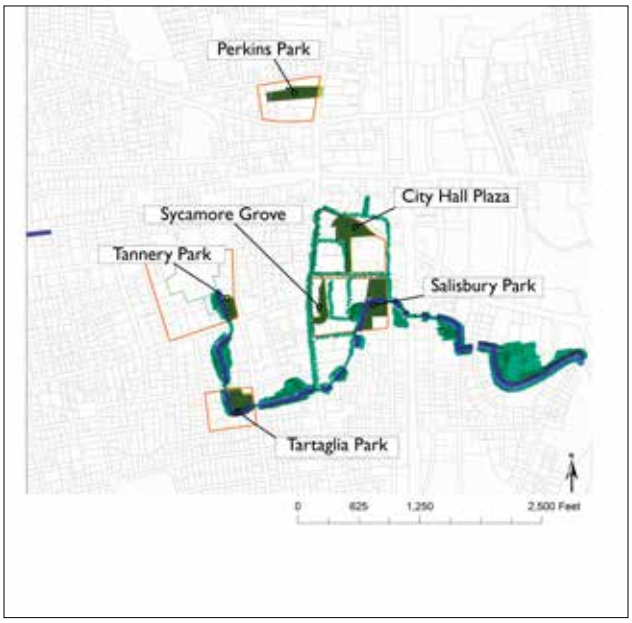
Given the history of flooding in certain areas and the rising cost of flood insurance, the City might consider developing criteria for identifying repetitive loss properties that might be suitable for municipal acquisition. These properties could potentially be converted to green space for stormwater infiltration, storage, and treatment.

Improve Air Quality and Climate

In order to improve air quality and regulate climate, these recommendations look for ways to reduce impervious surfaces, increase the urban tree canopy, and mitigate the heat island effect.

Increase and Improve Habitat

Since downtown green spaces are fragmented and lack connection to the larger conservations lands on the city periphery, they are unlikely to provide suitable habitat for larger mammals or forest dwelling species. However, urban areas have the ability to support a wide array of wildlife species, such as turkeys, song birds, amphibians, and many types of pollinators. Improving habitat for these creatures may also support a better quality of life for the city's residents. Citizen science programs can bring communities together and connect residents with the outdoors.



Recommended Actions

- Create vegetated buffers, forebays and bioretention basins along Salisbury Brook.
- Identify and preserve existing areas of 25' buffer along the brook.
- Incorporate permeable pavers in parking areas.
- Acquire or otherwise protect riparian areas.
- Acquire properties in the floodplain with a history of flood damage to convert to water infiltration and storage.
- Acquire land for the creation of permeable/ stormwater retention areas in the floodplain.
- Partner with private landholders for the creation of new infiltration areas.
- Create educational signs or artwork along the brook.
- Explore opportunities for daylighting the brook.
- Conduct an assessment of illicit discharge into Salisbury Brook.

THE BLUE BROOK

Urban Birds

Many bird species visit or make their homes in urban areas. Hawks may hunt from the tops of the taller buildings, ducks stop to feed in the brook, and wild turkeys walk the streets. Bird watching is a hobby that can be enjoyed anywhere, and Brockton is no exception. In Holyoke, a similarly sized city with an industrial past, birdwatcher and photographer Greg Saulmon documented 79 bird species in the downtown area. His photographs capture the beauty and adaptability of the birds that share our urban spaces, some of which are:

- Northern cardinal
- Tufted titmouse
- American robin
- Mallard duck
- Black-capped chickadee

Bird Habitat

Small green space additions or modifications can improve bird habitat in urban areas. Even container gardens can provide birds with a nutritious meal and attract birds for observation. Many native plants used in bioswales and gardens provide important food and habitat for birds, including:

- Sunflower
- Black-eyed Susan
- Coreopsis
- Little bluestem
- Blueberries

(Celebrateurbanbirds.org)

Black-capped chickadee

Northern cardinal

Blue jay

Tufted titmouse

Daylighting Definition

"Daylighting projects expose some or all of a previously covered river, stream, or stormwater drainage. Daylighting exists in several forms including:

Natural restoration – restoring a stream to natural stream conditions;*

Architectural restoration – restoring a stream to open air, flowing water but within a constructed channel; or

Cultural restoration – celebration of a buried stream through markers or public art used to inform the public of the historic stream path, although the stream remains buried" (8)

*"It is important to note that often natural restoration will have a constructed channel but the channel recreates a natural system with a porous, natural streambed rather than a concrete lined channel as with architectural restoration."

(American Rivers Daylighting Report)

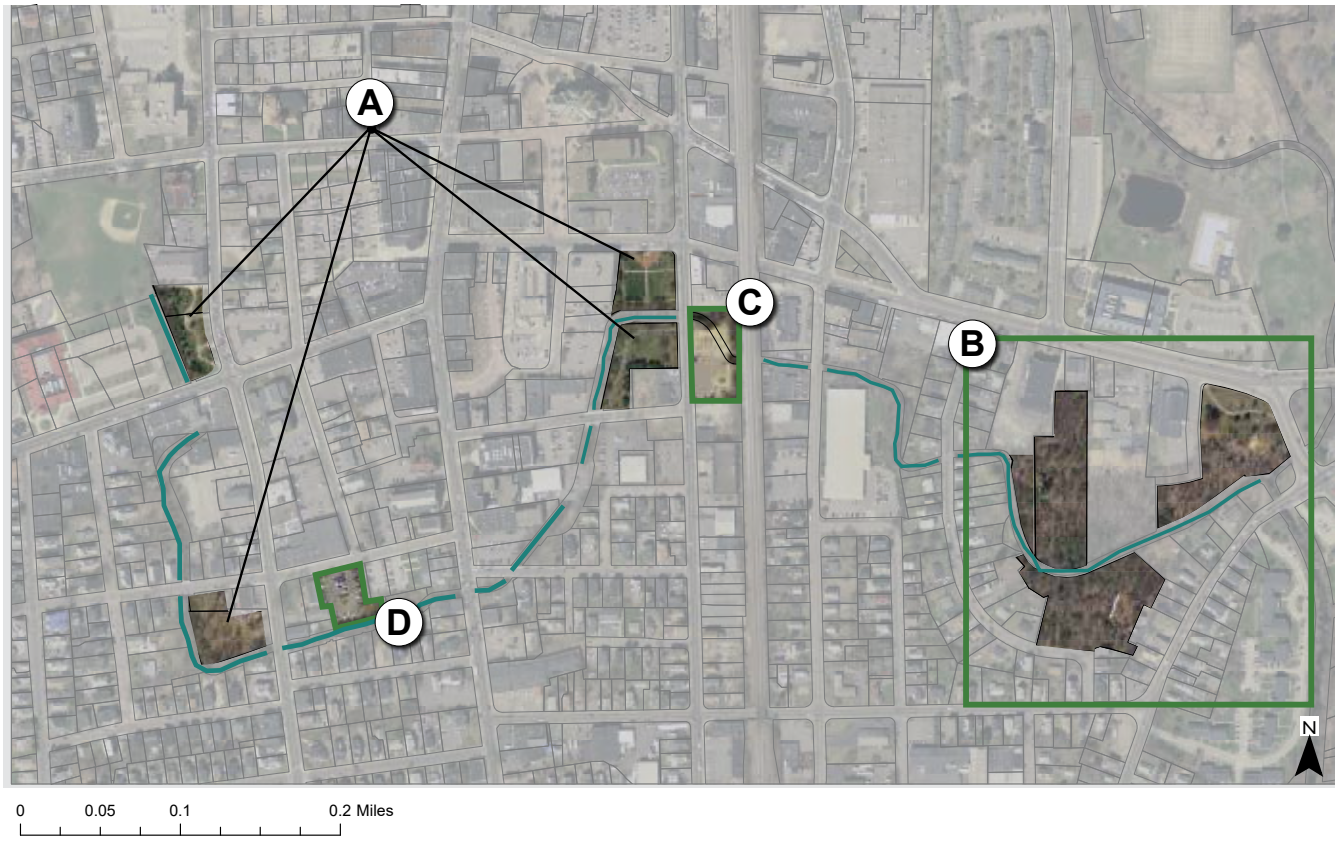
Daylighting Case Study

The following daylighting case study is from the American Rivers Daylighting Report:

"Daylighting streams for community revitalization, Arcadia Creek, Michigan Arcadia Creek in Kalamazoo, Michigan, was buried underground for almost 100 years before portions were daylighted as part of a major downtown redevelopment. This project highlights one of the most highly urbanized locations to be daylighted. While the stream was buried, flooding was frequent as the culvert containing Arcadia Creek was not large enough to handle increased runoff. City engineers researched replacing the culvert but found daylighting the creek to be cheaper. Construction of the project was between 1982 and 1992 with the project being completed in 1995. The total length daylighted was 1,550 feet with total project cost at $18 million, $7.5 million specifically for daylighting. Post daylighting, downtown businesses no longer have to pay for flood insurance. This downtown amenity now hosts over five major summer festivals which generate $12 million in revenues. To fund the revitalization, the downtown development authority issued bonds based on tax-increment financing. Those bonds are now being paid back by property tax revenues which have increased from $60,000 to $400,000" (12).

(American Rivers Daylighting Report)

THE BLUE BROOK



Possible Areas for implementation

The following demonstrate different strategies which can be applied along the length of Salisbury Brook depending on site conditions and opportunities.

[A] Three Parks Along Brook

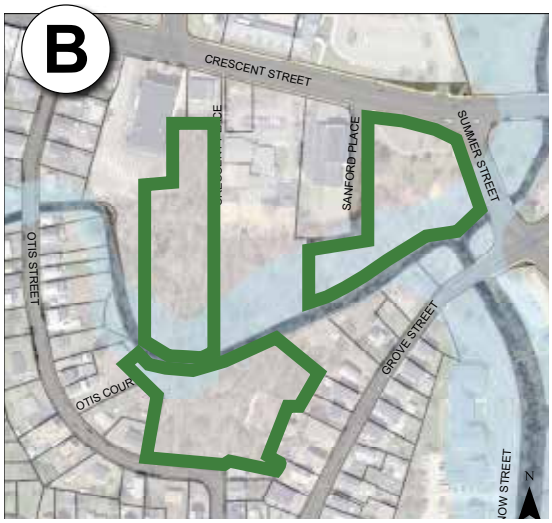
There are three parks in the study area that abut the brook, including Salisbury Park, Tartaglia Park, and Tannery Park. Vegetated buffers and bioretention strategies could be constructed on these sites to capture, treat and infiltrate stormwater. Increasing native vegetation and reducing turf in these green areas can increase water holding capacity. In addition, pollinator gardens and other types of flowering vegetation can increase pollinator habitat and aesthetic appeal.

[B] Riparian Area and Park Opportunity

Woodlands help to regulate stream systems by cooling water, reducing runoff, and controlling erosion. Trees also contribute to improved air quality and carbon sequestration. The City might consider partnering with landowners to protect patches of woodland such as the wooded area along Salisbury and Trout Brooks.

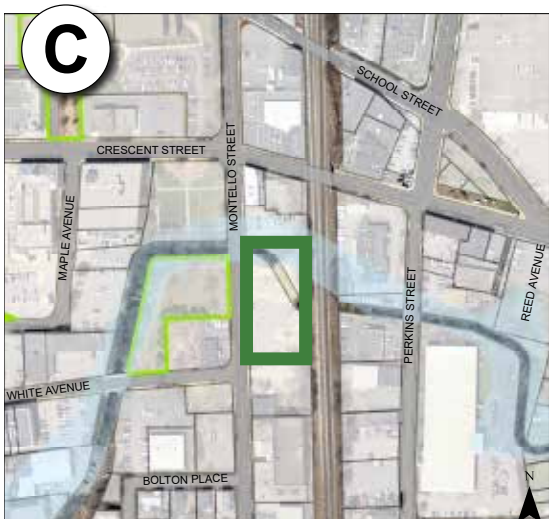
THE BLUE BROOK

There is currently an undeveloped municipally owned lot along Salisbury Brook. The City might consider converting this property to green space. Due to its location in the floodplain, this property is likely unsuitable for commercial or residential development. This green space could be developed to provide a community park and playground that would be able to withstand periodic flooding. Vegetated buffers and bioretention areas could be implemented along the brook to increase infiltration and treat stormwater before it reaches the brook.



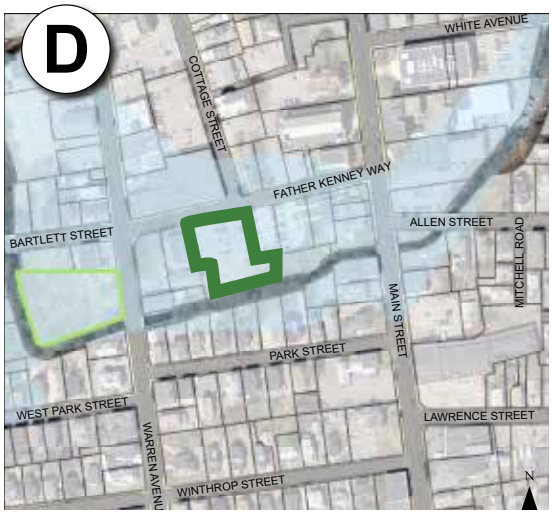
[C] Parking lot - City-Owned

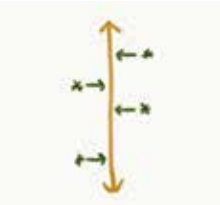
At a City-owned parking lot east of Montello Street, bordering the brook, several different strategies could be employed to meet the goals of increasing infiltration and treating stormwater. Permeable pavement could be installed in strategic areas, vegetated bioretention basins established along the borders of the lot, and a sediment forebay created along the brook to infiltrate and treat the first flush coming off the parking lot. Educational signage could be installed to highlight the ecological processes at work around this lot. This lot provides one of the only opportunities for daylighting a section of the brook. Daylighting the brook could increase hydrologic capacity, improve water quality, mitigate flood risks, and contribute to community revitalization.



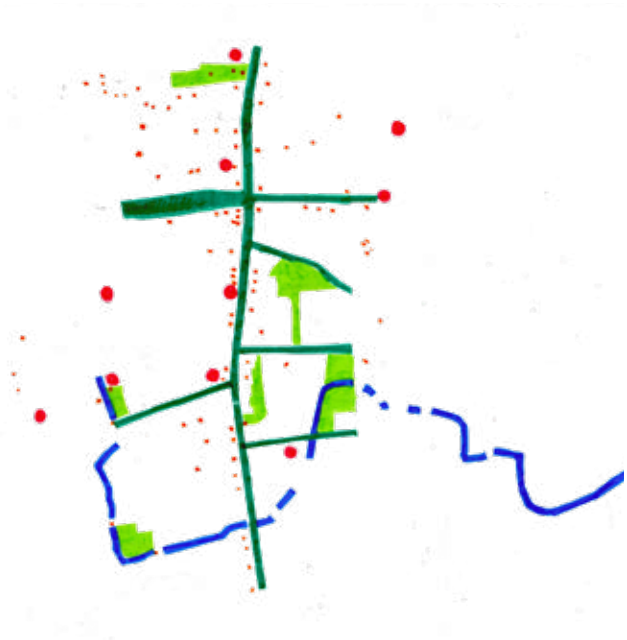
[D] Parking Lot - Private

A parking lot on Bartlett Street between Warren and Main Streets abuts Salisbury Brook, which runs through the center of the block. The City might create bioretention areas or convert part of the parking lot to permeable paving.





THE SPINE



Overview

The Spine conceptual design emphasizes meeting the community's social goals by improving social connectivity between the parks and bringing people to the parks through partnerships with community services and organizations. The focus of this concept is to apply strategies to Main Street as the central corridor which connects the parks to existing infrastructure, amenities, programming, and historical landmarks. The map illustrates the corridors along which strategies are concentrated, connecting the parks to existing amenities and infrastructure along Main Street.

Recommended Actions

- Evaluate and improve crosswalks, sidewalks, and pedestrian paths along Main Street and the identified corridors.
- Evaluate and improve street lighting along Main Street and the identified corridors.
- Add street trees and additional vegetation where feasible along Main Street and identified corridors.
- Identify community agencies and services nearby that can partner with and activate programming at the parks, and increase usership.
- Create historical wayfinding or tour that will connect historical sites to the social fabric of downtown.
- Identify areas on Main Street and in the parks where local art could be highlighted.

Connect Parks to Main Street

Main Street is a central corridor of downtown. Current development projects planned for the downtown seek to spur redevelopment along Main Street with potential spaces for storefronts, restaurants, and offices. Pedestrians can easily walk from Main Street to each of the green spaces downtown: City Hall Plaza, Sycamore Grove, Salisbury Park, Tartaglia Park, Tannery Park, and Perkins Park. Planting ornamental street trees, improving street lighting, and upgrading the safety and connectivity of pedestrian paths along Main Street and the side streets connecting the parks could provide visible connections from Main Street to the parks downtown and improve the perception of safety. These actions would help to activate existing connections, integrate parks with the City's other assets and reinforce the action items identified in the City's 2015 Downtown Action Strategy.

THE SPINE

Connect Parks to Community Services and Activate Programming

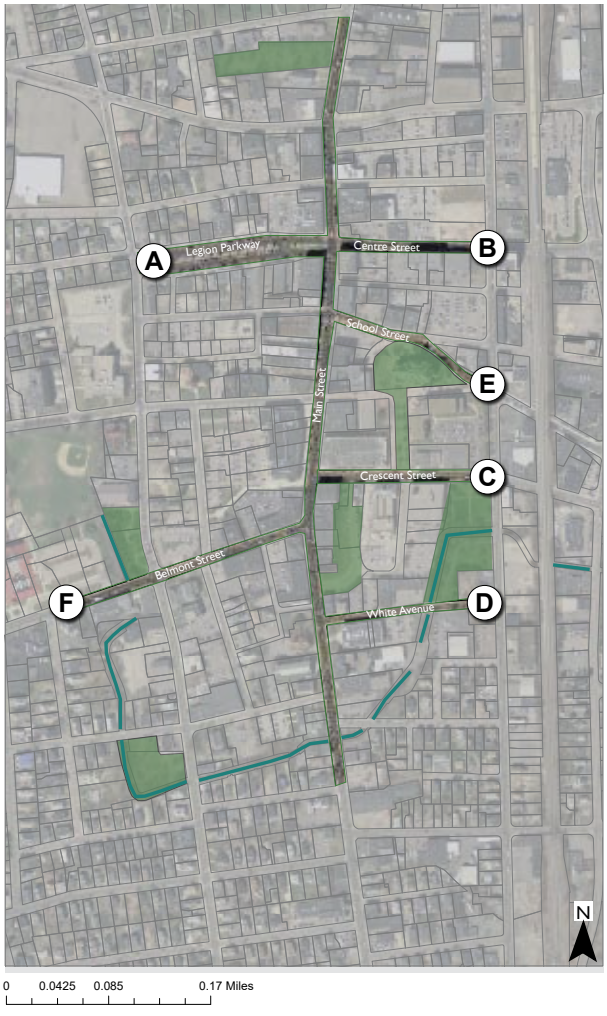
Downtown Brockton offers a number of amenities and services centered around Main Street. Educational and recreation organizations, such as the Boys and Girls Club, the YMCA, the Brockton Public Library, and Arnone Elementary School, are near to the parks. There is an opportunity for the City to partner with these organizations to create park programming. For example, children coming from the Arnone Elementary school or Boys and Girls club don't have to cross streets to access Tannery Park, but pathways in the interior of the block are not clearly visible from the elementary school and could be better designed. Given its location, Tannery Park might be utilized for environmental education opportunities or other programmed recreation. Enhancing these social and visual connections with strategies such as signs or walking paths, could make the parks more accessible and visually connected to the City's community services. Additionally, the City might partner with organizations, such as the Brockton Garden Club and the Greening the Gateway Cities Program, to diversify the trees and plants along these streets and in the parks.

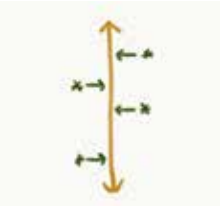
Highlight History

Brockton has a rich history that has been preserved in the form of historical buildings and monuments. The majority of these historical sites are concentrated around Main Street and aren't easily recognizable to passers-by. These structures could be re-integrated into the social fabric of downtown Brockton through educational kiosks or historical tours. Incorporating Brockton's past in residents' understanding of its present and future is a strategy for creating a sense of identity within the city.

Celebrate Local Art and Culture

Residents who attended the community meetings identified art as a potential strategy to improve the perception of downtown and highlight the city's history and culture. They suggested interactive sculptures in parks and murals along some of the older buildings. Brockton could partner with local schools or organizations, such as Brockton Arts, to bring art to Main Street and its intersecting corridors. There is currently a lack of art downtown and within the parks themselves. Art might be a way to highlight the increasing diversity of the city, as well as its industrial past. This could improve the social identity of downtown and celebrate what community members said was the number one asset of the city— its people.

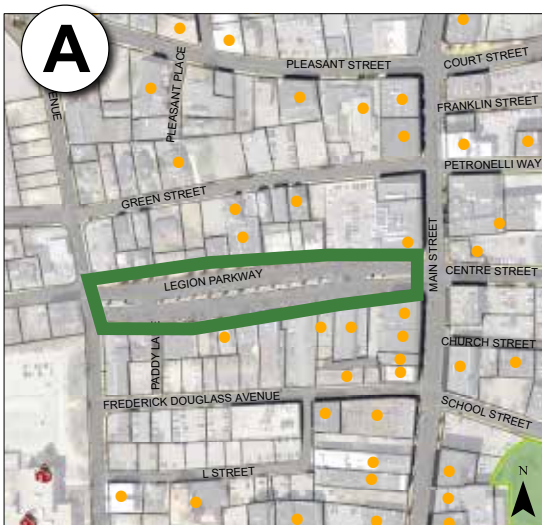




THE SPINE

Legion Parkway

Legion Parkway has been identified in the Downtown Action Strategy as a place for commercial redevelopment and an active, social streetscape. Its wide pedestrian corridor has the opportunity to become a prime location for business and retail directly off Main Street. Though it doesn't directly connect with the parks, this corridor offers room to incorporate greenery in the center median, which could also be designed to mitigate surface runoff. There is also room to incorporate strategies, such as street lights, street trees, and seating, that would make the street more pedestrian-friendly and safe.

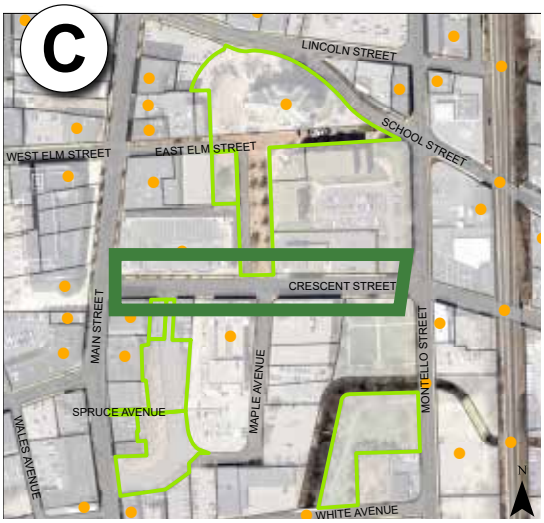


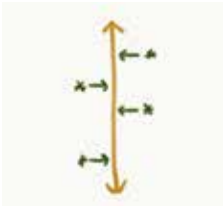
Centre Street

Centre Street is a direct connection from Main Street to the T station to the east. Adding street trees, signs, and improving crosswalks along Centre Street would offer a safe and clear pedestrian path from the commuter rail station to Main Street. Improving pedestrian connections would also improve access to the green spaces downtown for current and future residents who use the commuter rail.

Crescent Street

Crescent Street is connected to the most green spaces in the downtown, including City Hall Plaza, Salisbury Park, and Sycamore Grove. The largest public parking garage in downtown sits on the corner of Main Street and Crescent Street. People arriving by car could park here and walk directly to these three parks near Crescent Street. Adding crosswalks across Crescent Street and improving street lighting can encourage pedestrians to visit these parks and plazas.

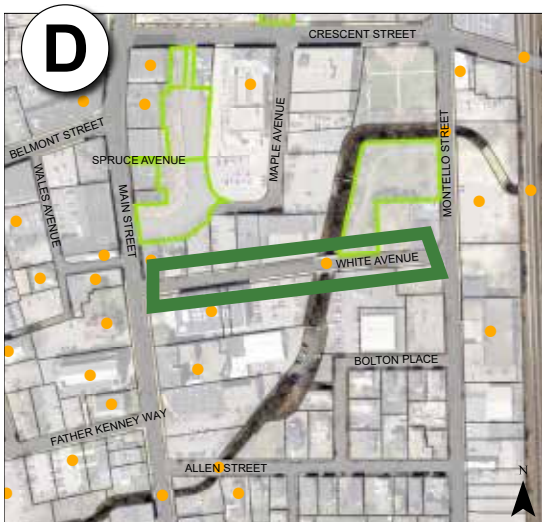




THE SPINE

White Avenue

White Avenue is a central side street in downtown that leads to the public library, but barriers, such as fencing and unclear cut-throughs to the north, make it difficult for pedestrians to cross. There is potential access to Salisbury Park and Sycamore Grove from White Avenue, but pedestrian paths are not well connected. Improving pedestrian pathways between the library and these green spaces may offer stronger visual and pedestrian connections that make the spaces feel accessible. Improving connectivity could also encourage programming, such as public education and community events, in these parks.



School Street

School Street is the most direct path to, and has the best view of, City Hall. However, there are not convenient pedestrian crosswalks from the public parking lot to the north. People have to cross the section of School Street where it divides into two. Though there is a direct view from Main Street to City Hall, the empty lot on the corner of Main Street and School Street doesn't feel like an inviting point of access. The City could improve visual connections, add street trees, signs, and improve lighting to better connect people from Main Street to this central hub. Extending City Hall Plaza onto a City-owned parcel on the north side of School Street and the parcel to the west could improve visual and pedestrian connections and offer more green space.

Belmont Street

Belmont Street has the opportunity to connect residents living near downtown, and children from the nearby elementary school, to Main Street. Planting street trees, improving lighting, and improving the safety of crosswalks and sidewalks along Belmont Street would improve the visual and physical connections from Main Street to Tannery Park and the nearby Tartaglia Park.

THE GREEN BLOCKS

"Urban renewal is a strategy for redeveloping and revitalizing substandard, decadent and blighted open areas for residential, commercial, industrial, business, government, recreational, educational, hospital, or other uses."

(Massachusetts Department of Housing and Community Development)

Urban Renewal

The Massachusetts Department of Housing and Community Development administers the Urban Renewal Program. Municipalities under M.G.L. Chapter 121B, are authorized to implement a wide variety of public actions to attract and support private development and growth. Within Brockton's designated downtown renewal area, the City has the authority to initiate the taking of private land by eminent domain, the disposition of property for redevelopment, building rehabilitation and demolition, and construction of public ways. The *Downtown Brockton Urban Revitalization Plan* (URP 2016) is guided by a decade of public planning projects and works in conjunction with the 2015 Downtown Action Strategy. The URP sets development goals for 2026.

Overview

The Green Blocks Design recommendation is guided by the City's current urban revitalization efforts. As the City implements its Urban Revitalization Plan through the Downtown Action Strategy, there are many opportunities to connect existing green spaces and integrate new green space and green infrastructure into plans for mixed-use development. During the planning process, the City can specify best practices and design strategies that decrease energy consumption and maintenance costs while increasing ecological services within the downtown area.

This is a block-by-block approach that prioritizes improving streetscapes and supplementing gray with green infrastructure by increasing tree canopy, bioretention and infiltration, and permeable surfaces. Incrementally implementing these changes while developing best practices and policies will help improve areas surrounding redevelopment sites.

The economic benefits of these strategies can be substantial. Increasing tree canopy alone can reduce building energy consumption by up to 25%. Studies in the United States have shown that planting trees designed to buffer wind and shade structures can amount to $2 billion annually in energy savings and increase property values by 7 to 20% (Arbor Day Foundation). An extensive study in New York City that factored in planting and maintenance costs concluded that the City receives $5.60 in benefits for every dollar spent on trees (Randall 2007).

THE GREEN BLOCKS

Infill development is underway in downtown Brockton. A ten-year redevelopment plan is being phased in starting with the "Enterprise Block" immediately west of the Metro Boston Train Station. It will take years to implement, and the City hopes to lay the foundation for future investment with this project. Defining best practices for design, construction, and maintenance at this early stage of urban renewal park by park and block by block can have immense cumulative effects on the ecological, social, and economic performance of the downtown landscape.

Ten-year vision plan for "Enterprise Block"

Portland Oregon Study

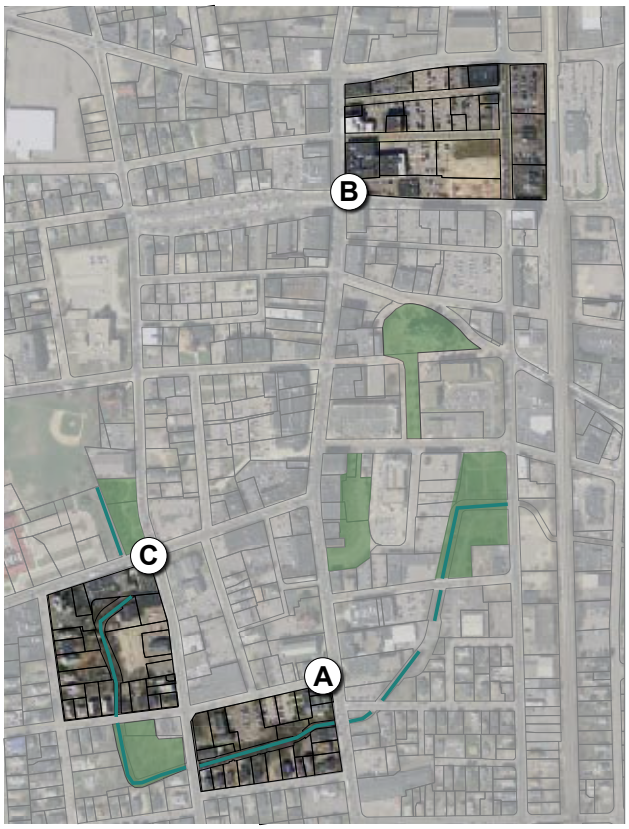
A 2010 study aimed to measure the value of tree canopy in Portland, Oregon, found that tree canopy cover within 100 feet of single-family homes directly correlates to an increase in real estate value, adding approximately $8,870 to the price of the house. This increase in value is the equivalent of adding 129 square feet of finished space. Applying the average effect of tree canopy across Portland yields a total value of $1.35 billion. An increase in property value is also reflected in an increase in property tax revenue for the city. The study projects that street trees would increase the assessed value by 52% and property tax revenue by $15.3 million annually.

Considering maintenance costs such as planting, leaf removal, and pruning, the City estimated their annual cost to be $1.28 million. The city concluded that the benefit cost ratio of Portland's street trees to be 12-1. (Donovan, 81)

THE GREEN BLOCKS

Areas for Implementation

The following city blocks were chosen based on criteria that prioritized locations where there is currently no green space within one-third of a mile from an existing park. Other considerations included blocks that have redevelopment projects already underway, contain a high percentage of City-owned land, are within the 100-year floodplain, and have a high ratio of impermeable surface parking.



River Walk

The Brockton Council on Aging provides services and programs to seniors in the community. Located at 10 Father Keeney Way and Main Street in downtown, the Council is developing a proposal to expand the facilities and build a river walk along the Salisbury Brook. This approximately 700-foot section of the brook is completely channelized and shaded with mature trees from Main to Warren Streets. Over 60% of the block is within the 100-year floodplain. The north side of the block is a mix of institutional and City properties with one acre of paved parking mid-block serving the two institutions on Main and Warren. Multi-family residential units sit on the southern half of the block.

A river walk along the concrete banks of the brook would create a public green space that brings people near the brook in a way that is not possible in other areas. Increasing the amount of permeable surface along the brook could help reduce the negative impacts of flooding and filter surface runoff from the parking lots. Adding tree trenches to the expansive parking lot can further help infiltrate stormwater runoff. A continuous river walk from Main to Warren connecting to Tartaglia Park would require access through private property. The relocation of the commercial business at 400 Warren Street and the conversion of this parcel to a riparian buffer and river walk would help mitigate flooding and could provide a more contiguous path connecting to Tartaglia Park.

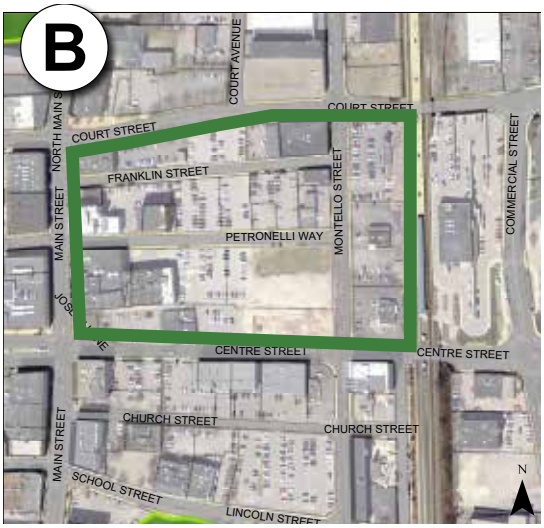
THE GREEN BLOCKS

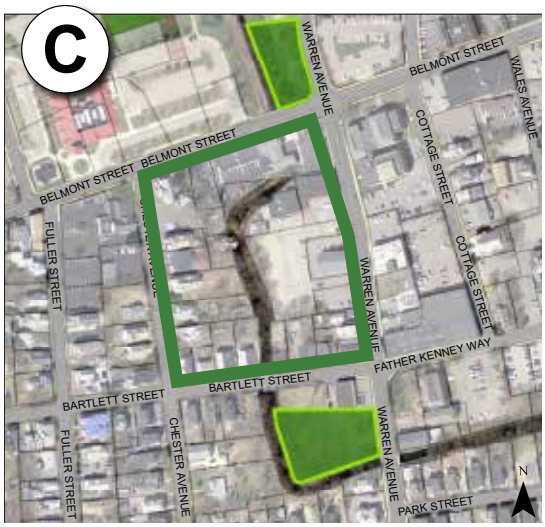
Enterprise Block

The Enterprise Block is a mixed-use development project spanning Court and Center Streets just west of the Metro T Station. The ten-year-long multi-phase project aims to add 55,000 square feet of commercial and office space, and over 200 units of affordable and market rate housing including artist live-work units ("Enterprise Center"). Additional development is to include retail, artist gallery space, and a 400-stall parking (Downtown Action Strategy). This is a significant increase in new and renovated building stock in the downtown and presents the opportunity to pilot large green infrastructure systems like permeable paving, street tree trenches, and stormwater cisterns into sidewalks, parking areas across the entire block. Green roofs, green walls, and building stormwater systems are strategies that can be integrated into new construction and renovations. The courtyard building typology proposed for the residential units creates central park spaces. Providing developers with incentives to integrate green infrastructure with public park space benefits the greater community and can attract people and further development.

Warren Avenue Park

The City owns a mid-block parking lot on Warren Street that abuts approximately 200 feet of Salisbury Brook. The brook bisects the block; zoning to the west is multi-family residential and to the east, C-2 commercial. Over 60% of the block is within the 100-year floodplain. A redesign of this parking lot could increase the hydrological capacity of this block, create a new green space, and provide room for a new mixed-use residential development as proposed by the City of Brockton Two Rivers Report (Hubert Murray, 2008). The Two Rivers Report also states that "the channelization of the brook as it passes under Bartlett Street appears to pose undue restriction on the flow of water during times of heavy rainfall" (Hubert Murray 37). The relocation of the commercial business at 69 Bartlett Street and the conversion of this parcel to a riparian buffer and pathway would help mitigate flooding in addition to extending the river walk.





Toolkit for Activation

Well designed urban green spaces can provide a host of social, environmental, and economic benefits. As public open spaces, green spaces can be cultural destinations that help define a community, a neighborhood, and a city, connecting people to the outdoors and nature. They are places of outdoor activity and recreation and can be designed to enhance existing ecological services.

Brockton's green spaces are an untapped resource. Parks in the downtown area suffer from low usership and negative perceptions of safety, and they need improvements to infrastructure and amenities. The strategies below set cross-sector goals to connect the existing green spaces to their immediate urban setting and increase usership. They are guided by the social, environmental, and economic principles outlined in this report and work to address the City's park revitalization goals.

Specific strategies to accomplish these goals are presented under six functional categories:

- Accommodate Passive and Active Recreation
- Improve Amenities and Infrastructure
- Improve Environmental Conditions
- Mitigate Stormwater Runoff
- Build Partnerships Through Programming
- Improve Aesthetics and Sense of Place

In many cases, a strategy presented in one category can function in another category. For example, planting trees along a plaza can fulfill the ecological function of improving air quality and reducing surface water runoff. Those same trees can also contribute to the improved social function of the plaza by providing shade for users and increasing aesthetic appeal.

Street trees provide shade for pedestrians and improve air quality.

Accommodate Passive and Active Recreation

Brockton's downtown green spaces are modest in size, but there is still room for passive and active recreation within these patches of open space and along adjacent and connecting city streets. Free public venues for play, exercise, respite, and social gatherings, green spaces can inspire activity and support healthier communities. Strategies to increase passive and active recreation use include:

- Exercise Stations
- Walking Loops
- Playgrounds and Playground Paving
- Playground Games Integrated into Paving
- Outdoor Table Games
- Play Fountains and Splash Pads
- Bicycle Paths and Bicycle Parking
- Furniture (Benches and Tables)
- Picnic Areas and Barbecue Facilities
- Solar Shade Structures
- Event Structures

Active Lifestyles

The Center for Disease Control and Prevention recommends adults perform at least 150 minutes of physical activity weekly, and children 60 minutes daily. The Massachusetts Department of Public Health 2009 studies of obesity rates in Brockton show 40.3% of male and female adolescents in grades 1,4,7, and 10 are obese or overweight; the state percentage is 31.3%. Green spaces can promote active lifestyles and improve public health outcomes ("Current Physical Activity Guidelines " and "The Status of Childhood Weight in Massachusetts,").

Active Living Research

There are many interdisciplinary research initiatives that focus on planning healthy communities and explaining the relationship between green spaces and human well-being. These resources can guide planning initiatives.

- The Vibrant Cities Lab, U.S. Forest Service, American Forests, National Association of Regional Councils
- The Landscape and Human Health Laboratory, University of Urbana-Champaign
- The Center for City Park Excellence, The Trust for Public Land
- Active Living Research, University of California San Diego School of Medicine
- Healthy Parks Healthy People, The National Parks Service
- Parks, Trails, and Health Workbook, The National Park Service, Center for Disease Control and Prevention
- Green Cities: Good Health, University of Washington

A splash pad creates opportunities for active recreation.

Table-top chess boards activate a plaza.

TOOLKIT FOR ACTIVATION

Improve Multimodal Infrastructure

Improvements to multimodal transportation infrastructure can help connect residents and visitors to Brockton's downtown green spaces while reaching the city's walkability and transit-oriented goals for the downtown area and adhere to the City's Complete Streets Ordinance. The City of Brockton 2014 Walk Assessment identified sidewalks, bicycle paths, and pedestrian connections that need improvements. Repairs and improvements may include repainting faded crosswalks, aligning curb ramps and crosswalks to create more efficient circulation, narrowing travel lanes to shorten crossing distances, and upgrading signage and traffic signaling equipment to align with traffic patterns. The strategies below offer tools to activate existing physical and visual connections and provide improved pedestrian exchanges and amenities (Walk Assessment).

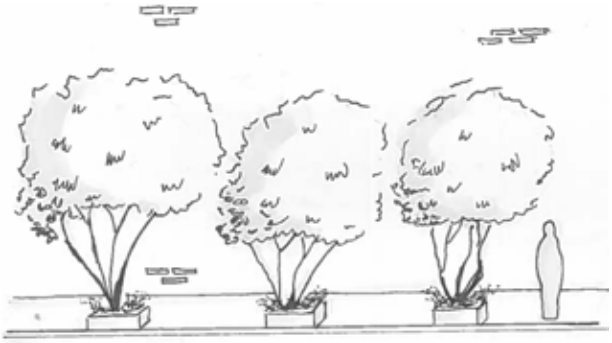
- Street Trees
- Pedestrian Bridges
- Vegetated Pedestrian Refuge Islands
- Vegetated Curb Extensions
- Raised Crosswalks
- Limited Vehicle Access and Pedestrian-Only Zones
- Energy-Efficient Street and Park Lighting
- Sidewalk Furniture (Benches, Tables)
- Wayfinding and Informational Kiosks
- Historical Landmark Signs

How are cities using wayfinding to improve the pedestrian experience?

In 2008, the City of Portland, Maine produced a wayfinding strategy report to improve the pedestrian experience by setting policies, graphic standards, and criteria for developing an improved wayfinding network within the city. Portland developed a hierarchical system to bring attention to the most popular destinations within the existing downtown district framework. In addition, Portland developed criteria for specific types of wayfinding, including the following:

- Parking Identification Signs: Used to identify each parking facility.
- Pedestrian Directional Signs: All approved attractions are permitted on pedestrian directional signs.
- Kiosks/Maps: The majority of destinations such as retail, parks, emergency services, seasonal attractions, historic landmarks, churches, public restrooms, and parking garages will be located and identified on a kiosk or directory.
- Enhanced Banner and Flag Program: Used around the perimeter to identify each district and throughout the primary pathways of each district. These can be used to promote seasonal events as well.
- Destination Identity Signs: Used to indicate districts, parks and public spaces, trails, greenways, bike paths, and historical landmarks (Wilbur Smith Associates 17).

Brockton could improve its pedestrian experience and highlight the social aspects of the city using some of these wayfinding strategies. This could create a better sense of place and character in the city.



Street trees offer shade for pedestrians, making the street more walkable and aesthetically pleasing.

TOOLKIT FOR ACTIVATION

"The City of Brockton is committed to improving transportation, citizen safety, and constructing a transportation network that accommodates all modes of transportation equitably." *City of Brockton Complete Streets Ordinance*

Before and after the installation of bike lanes on Allen and Pike Streets in New York City.

Complete Streets

The Complete Streets approach to street design considers people of all ages, backgrounds, and abilities in improving the safety and accessibility of a transportation network. Different modes of transportation, such as walking, bicycling, driving, or taking public transportation are integrated into a planning, scoping, design, implementation, operation, and maintenance plan for roads.

"Complete Streets Infrastructure means physical street features that contribute to a safe, convenient, or comfortable travel experience for users, including but not limited to elements such as: sidewalks; shared use paths; bicycle lanes; automobile lanes; paved shoulders; street trees and landscaping; planting strips; curbs; accessible curb ramps; bulb outs; crosswalks; refuge islands; pedestrian and traffic signals, including countdown and accessible signals; signage; street furniture; bicycle parking facilities; public transportation stops and facilities; transit priority signalization; traffic calming devices such as rotary circles, traffic bumps, and surface treatments such as paving blocks, textured asphalt, and concrete; narrow vehicle lanes; raised medians; and dedicated transit lanes."

The City of Brockton adopted the Complete Streets Plan in an amendment to Chapter 20 Streets and Sidewalks Ordinance on July 25, 2016.

Raised crosswalk contributes to pedestrian comfort and safety. Median refuge island allows pedestrians to cross multiple lanes of traffic.

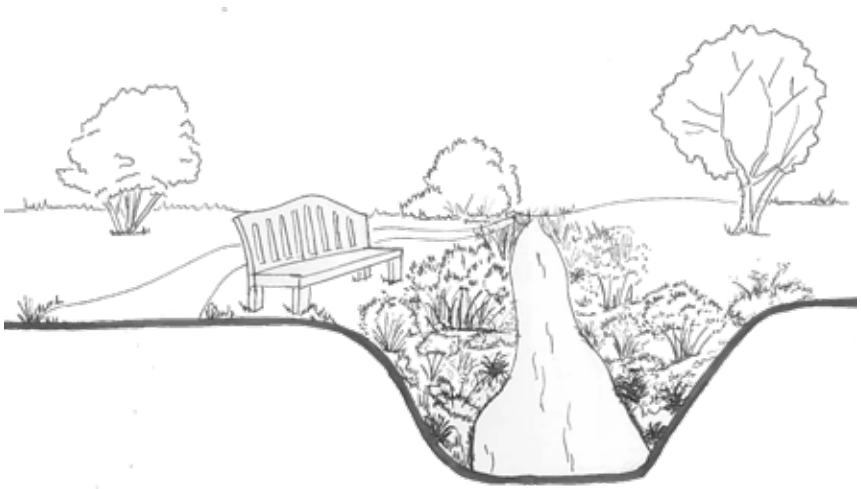
Improve Environmental Conditions

Trees and shrubs play an important role in regulating climate and improving climate quality in urban areas. They cool buildings, roads, and pedestrian areas through shading and evapotranspiration, reducing the urban heat island effect. They sequester and store carbon from the air and filter airborne particulate pollutants, significantly improving air quality. Trees and large vegetation also buffer wind, which can reduce nearby buildings' energy use. Studies have also shown that trees can dampen noise by three to five decibels. Increasing large vegetation in urban areas benefits humans and wildlife, proving habitat for birds, insects, and other small mammals. Strategies for improving environmental conditions include:

- Increase street tree canopy
- Plant trees within or on edges of parking lots
- Expand the urban forest
- Plant trees as windbreaks
- Install bioswales and rain gardens
- Increase vegetated buffers along property lines
- Protect and expand existing riparian buffers
- Implement cool roofs
- Implement cool pavements

The Urban Heat Island Effect

On average, cities are 1.8 to 5.4 degrees hotter during the day than rural areas in the same zone. The urban heat island Effect occurs in areas where non-reflective, heat collecting, impervious surfaces absorb a high degree of incoming solar radiation. This stored heat, combined with the heat produced by building mechanical systems like air conditioners, contribute to the development of "heat islands" which are experienced across the city. With the increase in temperatures comes an increase in heating and cooling energy demands. Air quality is reduced, leading to respiratory health problems, heat exhaustion, and heat stroke. These degraded environmental conditions affect environmental justice populations without access to air conditioners or cooling centers. Increased vegetation, tree canopy, and reflective of roof surfaces in cities can reduce the urban heat island effect and significantly improve the quality of life of its inhabitants. ("Benefits of Trees")



A vegetated buffer along the brook filters runoff and increases habitat

TOOLKIT FOR ACTIVATION

In Chicago, trees remove more than 18,000 tons of air pollution each year.

(US Forest Service, 2013)

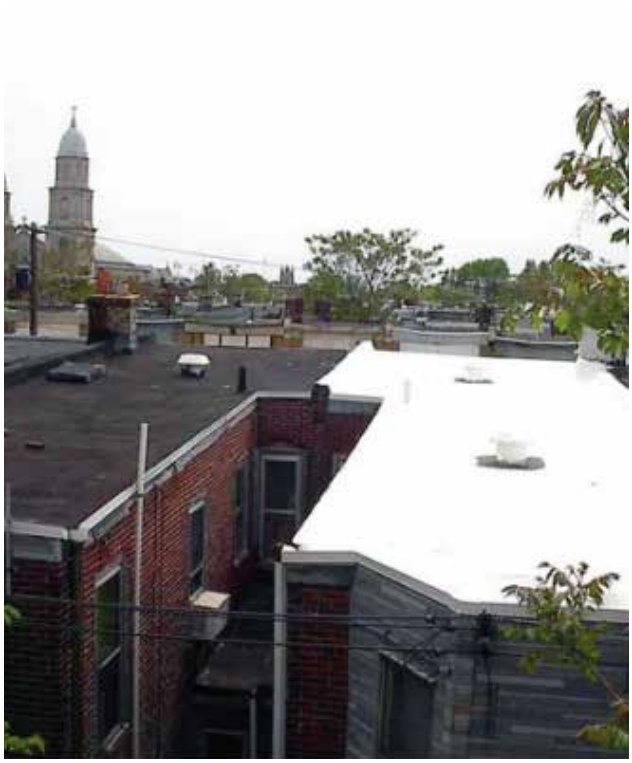
Evapotranspiration and Shading

Evapotranspiration is the sum of the processes by which water is transferred from the earth to the atmosphere through evaporation and transpiration. Evaporation is the conversion of water from a liquid to a gas. Transpiration is the process by which a plant's vascular system uses water and allows evaporation through its leaves, stems, and flowers. Shading reduces surface temperatures below the tree canopy, reducing the amount of heat transmitted into buildings and into the air. Studies show evapotranspiration alone or in concert with shading can substantially reduce peak summer air temperatures by 33-39 degrees. ("Reducing Urban Heat Islands" pg. 2)

A bioretention bump-out takes stormwater off the street. Plants release some of the water into the air through evapotranspiration.

Cool roofs

A cool roof is designed to increase the reflectivity of a roof and decrease heat storage by using reflective materials and coatings. The EPA Compendium of Strategies to reduce urban heat islands presents studies on specific cool-roof technologies. These studies show that cool roofs can deliver significant energy savings for only a slight increase in cost ("Reducing Urban Heat Islands" and "Planting Healthy Air").



A cool roof (right), increases energy savings and reduces the urban heat island effect.

TOOLKIT FOR ACTIVATION

Manage Stormwater

Urban stormwater runoff, which includes runoff from impervious surfaces like streets, parking lots, rooftops, compacted lawns, and other paved surfaces, is a significant source of water quality impairment in the United States (Vigil 47-48). Reducing impervious surfaces, increasing ground vegetation, and trees, and implementing slow release storage systems like bioretention basins can help slow, treat, and cool stormwater. These practices can reduce the cumulative negative effects on the environment, municipal, and homeowner budgets, and quality of life. Green infrastructure filters pollutants, toxins, bacteria, and trash entering waterways. It reduces the physical impacts of streambank erosion and deposition caused by frequent and intense flows and flooding. Slowing, cooling, and treating stormwater mitigates the quantity of degraded water entering waterways and negatively impacting aquatic habitat. (Urban Storm Water Preliminary Data Summary) An integrated approach to stormwater management might include:

- Street Trees
- Bioswales
- Bioretention Basins
- Green Roofs and Green Walls
- Permeable Paving
- Vegetated Buffers
- Riparian Buffers

Bioswales, Rain gardens, and more...

Rain Gardens

Rain gardens, sometimes called bioretention cells, were developed in Maryland in 1990. Designed properly, they can infiltrate 80 to 95% of annual stormwater, and provide storage and filtration for the first flush of a rain event (PennState Extension). Their size and shape depend on their soil characteristics and the area they are intended to drain. They are usually planted with species that can withstand both drought and periodic flooding. Because rain gardens are often in highly visible areas, they typically contain more flowering plants than bioswales or bioretention basins.

Bioswale and Bioretention Basins

Like rain gardens, bioswales and bioretention basins slow and infiltrate stormwater runoff. However, they are usually constructed to manage runoff from larger areas. Instead of employing existing soils as rain gardens do, these large-scale systems often use engineered soils to achieve optimal infiltration and treatment of stormwater (Soil Science Society of America). Bioswales and bioretention basins are also planted with attractive, flood-tolerant species that work to treat polluted runoff.

Sediment Forebay

A sediment forebay is a depression or bermed area that slows the flow and allows sediments to settle out before the stormwater reaches a swale, basin, or other stormwater treatment system (Massachusetts Clean Water Toolkit).

A bioretention basin manages stormwater in a parking lot.

TOOLKIT FOR ACTIVATION

Build Partnerships Through Programming

Urban parks and open space provide more than a venue for public and private events. They can be a catalyst for building public interest and partnerships that support specific initiatives. Actively programming urban parks and open spaces gives residents a reason to use these public spaces and can lead to an increase in civic interaction, strengthening social ties and invigorating communities. Partnerships between schools, non-profit organizations, private businesses, and the City can be centered around open spaces, invigorating urban life. Strategies for active programming include:

- Community Gardens
- Educational Gardens
- Public Art, Film, Music Events
- Outdoor Eating Areas
- Seasonal Events
- Specialty Food Events
- Summer Pop-Ups
- Annual Festivals
- Culturally-Specific Programming
- Historical Society Walking Tours
- Greater Brockton Health Alliance

Art in public spaces can contribute to a positive city image.

Amenities for outdoor eating bring social gatherings outside. Movable furniture contributes to a positive user experience and is seldom removed from parks and plazas.

Community gardens provide space for all residents to get outside, play in the dirt, and grow food or flowers.

TOOLKIT FOR ACTIVATION

Improve Aesthetics and Sense of Space

Soft and malleable, urban green spaces provide a respite from urban hardscaping. Open spaces provide places of pause, rest, and play. They offer visual and sensory interests, including color, texture, smells, and a connection to nature and seasonal changes. Green spaces can define neighborhoods and the communities they serve, and they can strengthen connections to surrounding assets. The elements below can highlight a neighborhood's assets and foster a sense of place.

- Ornamental / Specimen Trees
- Urban Forests
- Pocket Parks and Courtyards
- Pollinator Gardens
- Play Fountains
- Playgrounds
- River Walks
- Children's garden
- Pedestrian Bridges
- Historical Monuments
- Structures
- Nature watching

Magnolia Trees blooming in Spring in a park in Philadelphia

Public art in Philadelphia takes on many forms from chalk art to painted murals

Planning for Implementation

Community Involvement is Key

Resident-led planning and maintenance of park spaces can be a key support for active and attractive neighborhood parks. The quality of parks is directly affected by the way their neighborhoods use them. Engaging the residents of the downtown neighborhoods in the planning and maintenance of the parks can play a role in the success and longevity of the city's green space revitalization efforts.

Linking the parks strongly to their surrounding neighborhoods and creating a sense of ownership and territory has been identified by community meeting members as a strategy for improving park usership and perceptions of safety.

Increasing community outreach and planning involvement on the neighborhood level can help to foster ownership and pride in the city's green spaces. In addition, leadership and planning on the neighborhood level can help guide municipal priorities in redevelopment. This is especially true for Tartaglia, Tannery, and Perkins Parks which lie between the current residential and commercial districts. Parks like City Hall Plaza and Salisbury Park will soon be in proximity to new mixed-use commercial and residential development. These new residents will also need to be included in the ongoing planning and implementation process.

Involving Residents in the Planning Process

The 2017 Brockton urban agriculture plan, *A Plan Takes Root: Brockton Urban Agriculture* (Tensen and Kilduff), recommends the formation of precinct planning units. These units would formalize neighborhood involvement in the planning process and provide the City with valuable feedback on the revitalization of downtown green spaces. In addition, municipal officials should consider the following guidelines regarding community participation as recommended by the American Planning Association (APA Policy Guide on Neighborhood Collaborative Planning).

- City plans should incorporate neighborhood level perspectives in the City's decision-making and planning processes.
- City government should establish city-wide goals and criteria for approving neighborhood plans. These criteria should be developed with the participation and support of the neighborhoods.
- City government should be encouraged to coordinate the resources of the city according to approved neighborhood plans.
- The municipality should actively solicit neighborhood participation in the overall budget process to truly reflect neighborhood needs and interests. Neighborhoods should see tangible benefits come out of their work and the City should favor neighborhoods that undertake neighborhood planning.
- The City needs to involve and educate elected and appointed officials and municipal employees about the importance of neighborhood plans and the planning process.
- Effective neighborhood planning requires that the municipality provide regular opportunities, formal and informal, for neighborhood leaders across the municipality to meet among themselves and with local officials to discuss how the implementation of neighborhood planning is going and to compare progress with their own and the community's overall goals.

Park Maintenance and Park Ambassadors

Park ambassadors are community volunteers who assist the Parks Department in caring for the parks, bridge the gap between the department and the community, foster community stewardship of the parks, and enhance the safety of park visitors. They often serve a one-to-two year term and commit to visiting their park on a weekly or monthly basis to observe, pick up trash, and document park conditions and activity. They may also organize one to two park-related events in the course of a year. Cities often provide volunteers with an orientation, information on park activities throughout the year, and maintenance equipment such as trash bags and gloves.

Residents can also be engaged to address the maintenance and safety needs of the parks through park ambassadors. Park ambassador programs are in place in cities across the country such as Bloomington, IN; Allen, TX; Liberty, MO; and Vaughan, CA ("Park Ambassador"). These programs allow City departments to organize volunteers to address park maintenance and safety needs while community members receive some municipal support for their volunteer efforts. Park ambassador programs vary widely from city to city and can be tailored for Brockton's needs and resources.

Steps for implementing a Park Ambassador Program:

- Research different ambassador programs
- Consult ambassador program facilitators in other cities
- Engage with stakeholders to determine the appropriate model

Order of Importance for Implementation and Opportunistic Prioritization

Given the limitations of City resources, it is recommended that the City approach project prioritization opportunistically. As funding becomes available, or redevelopment projects come up for approval, the City can negotiate the implementation of green space elements. Gathering feedback for prioritization of projects from residents in the downtown area will be necessary to maximize quality of life improvements. As far as possible, implementation of green space elements should align with priority areas identified by downtown residents.

Action Items for Prioritization:

- Assess current resources and funding
- Gather information on project prioritization from precinct planning units
- Identify elements of the green space plan that most closely meet resource and community priority requirements

Appendix

Map Data Sources • 93

Survey • 106

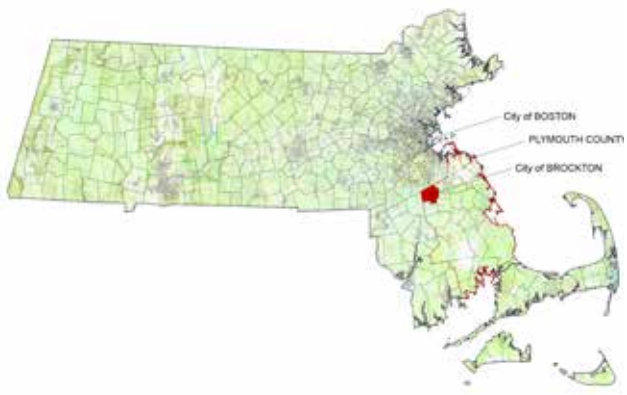
Works Cited • 111

Image Sources • 115

About Us • 117

Map Data Sources

INTRODUCTION

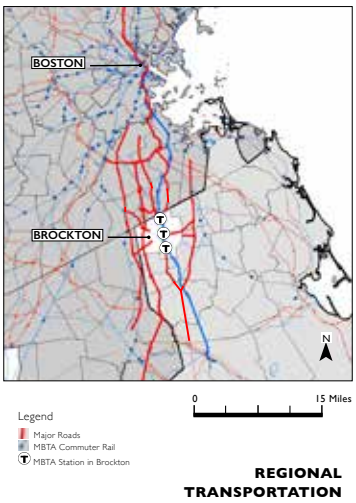


State Locator

Massachusetts Office of Geographic Information (MassGIS):

Community Boundaries (Cities and Towns)

USGS Topographic Quadrangle Images



REGIONAL TRANSPORTATION

Transportation - Regional

Massachusetts Office of Geographic Information (MassGIS):

MassDOT Roads

County Boundaries

Community Boundaries (Cities and Towns)

City of Brockton, Planning Department:

MBTS Line

MBTA Stations

MEDIAN INCOME PER HOUSEHOLD

Median Household Income - City

Massachusetts Office of Geographic Information (MassGIS):

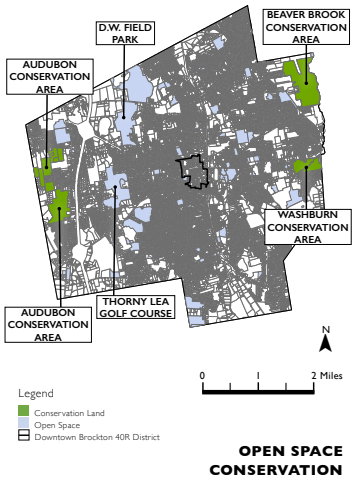
Datalayers from the 2010 U.S. Census

Community Boundaries (Cities and Towns)

City of Brockton, Planning Department:

40R Expansion

EXISTING CONDITIONS



OPEN SPACE CONSERVATION

Open Space Conservation- City

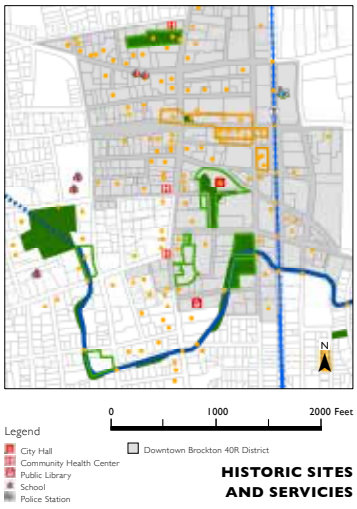
Massachusetts Office of Geographic Information (MassGIS):

Land Use (2005)

Community Boundaries (Cities and Towns)

City of Brockton, Planning Department:

Tax Parcels



HISTORIC SITES AND SERVICIES

Places - Downtown

Massachusetts Office of Geographic Information (MassGIS):

Land Use (2005)

Massachusetts Historical Commission (MHC) Historic Inventory

Town and City Halls (2017)

Libraries

Community Health Centers

City of Brockton, IT Department:

Waterlines

Fire Stations

Schools

Brockton Police Department

City of Brockton, Planning Department:

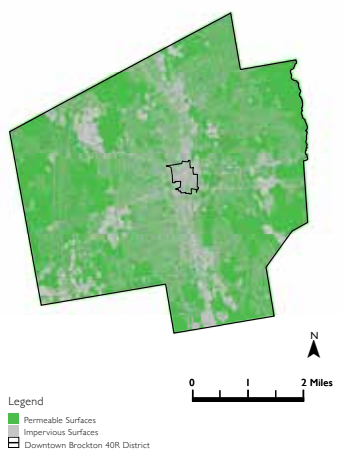
Tax Parcels

40R Expansion

Structures

MBTS Line

MBTA Stations



IMPERVIOUS SURFACES

Impervious Surfaces - City

Massachusetts Office of Geographic Information (MassGIS):

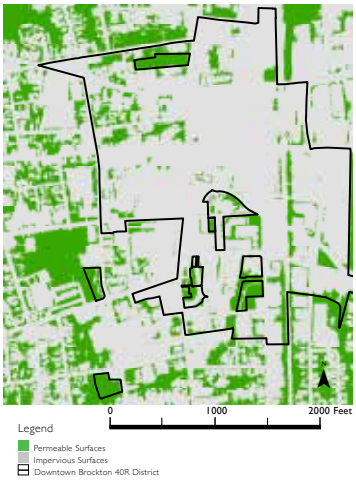
Impervious Surfaces

Community Boundaries (Cities and Towns)

City of Brockton, Planning Department:

40R Expansion

Roads



IMPERVIOUS SURFACES

Impervious Surfaces - Downtown

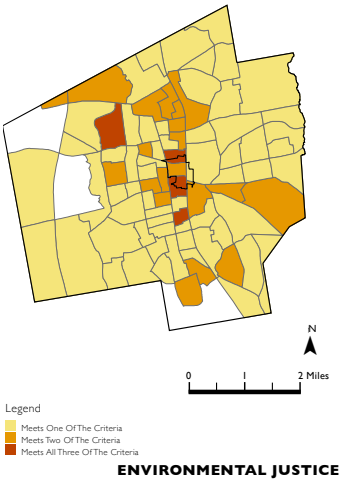
Massachusetts Office of Geographic Information (MassGIS):

Impervious Surfaces

City of Brockton, Planning Department:

40R Expansion

Roads



ENVIRONMENTAL JUSTICE

Environmental Justice - City

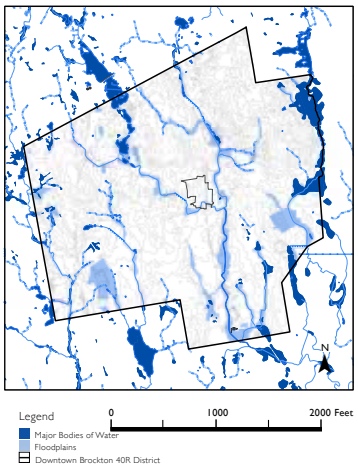
Massachusetts Office of Geographic Information (MassGIS):

2010 U.S. Census Environmental Justice Populations

Community Boundaries (Cities and Towns)

City of Brockton, Planning Department:

40R Expansion



WATERWAYS

Waterways - City

Massachusetts Office of Geographic Information (MassGIS):

Hydrography (1:25,000)

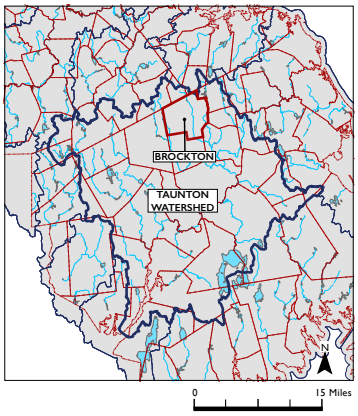
Contours (1:25,000)

FEMA National Flood Hazard Layer (2017)

Community Boundaries (Cities and Towns)

City of Brockton, Planning Department:

40R Expansion



TAUNTON WATERSHED

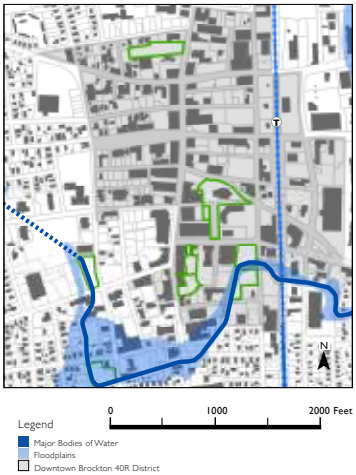
Watershed

Massachusetts Office of Geographic Information (MassGIS):

Community Boundaries (Cities and Towns)

Major Watersheds

USGS Major Ponds and Major Streams



100 YEAR FLOODPLAIN

Flooding - Downtown

Massachusetts Office of Geographic Information (MassGIS):

FEMA National Flood Hazard Layer (2017)

City of Brockton, IT Department:

Waterways

City of Brockton, Planning Department:

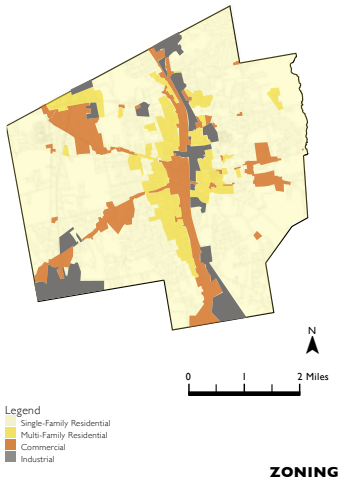
Tax Parcels

40R Expansion

Structures

MBTS Line

MBTA Stations



ZONING

Zoning - City

Massachusetts Office of Geographic Information (MassGIS):

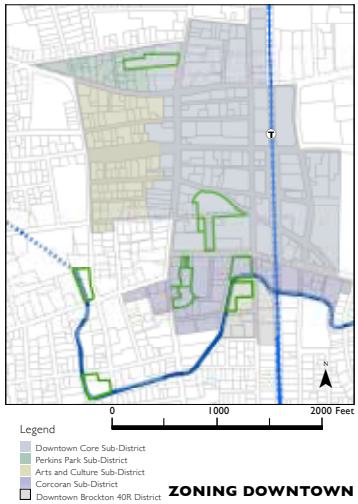
Community Boundaries (Cities and Towns)

City of Brockton, Planning Department:

Roads

City of Brockton, Building Department

Zoning Map



ZONING DOWNTOWN

Zoning - Downtown

City of Brockton, IT Department:

Waterways

City of Brockton, Planning Department:

Roads

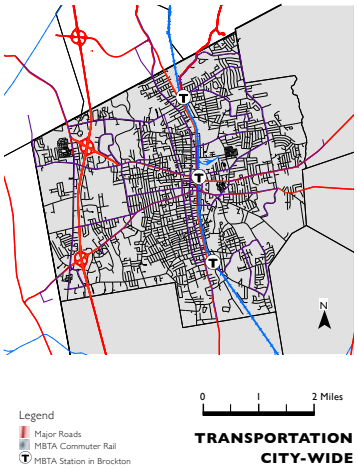
Downtown Smart Growth Overlay District Amendment (2014)

Tax Parcels

40R Expansion

MBTS Line

MBTA Stations



Transportation - City

Massachusetts Office of Geographic Information (MassGIS):

MassDOT Roads

County Boundaries

City of Brockton, IT Department:

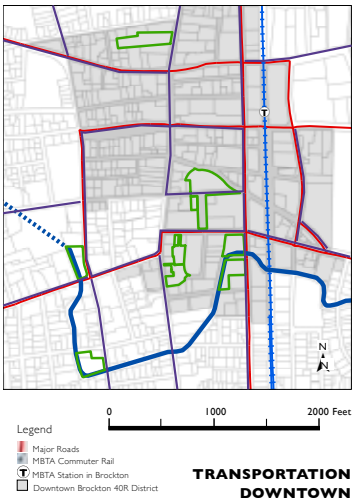
Brockton Boundary

City of Brockton, Planning Department:

Roads

MBTS Line

MBTA Stations



Transportation - Downtown

Massachusetts Office of Geographic Information (MassGIS):

MassDOT Roads

City of Brockton, Planning Department:

Tax Parcels

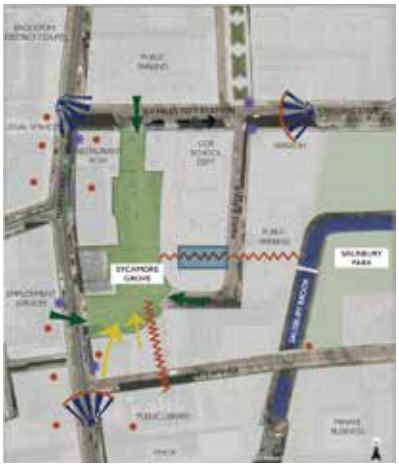
40R Expansion

MBTS Line

MBTA Stations

DOWNTOWN PARKS ANALYSIS

City Hall Plaza



Sycamore Grove

Perkins Park

Tannery Park

Salisbury Park

Tartaglia Park

Massachusetts Office of Geographic Information (MassGIS):

Massachusetts Historical Commission (MHC) Historic Inventory

USGS Color Ortho Imagery (2013/2014)

City of Brockton, Planning Department:

Tax Parcels

DOWNTOWN PARKS RECOMMENDATIONS

City Hall Plaza

Sycamore Grove

Perkins Park

Tannery Park

Salisbury Park

Tartaglia Park

Massachusetts Office of Geographic Information (MassGIS):

Massachusetts Historical Commission (MHC) Historic Inventory

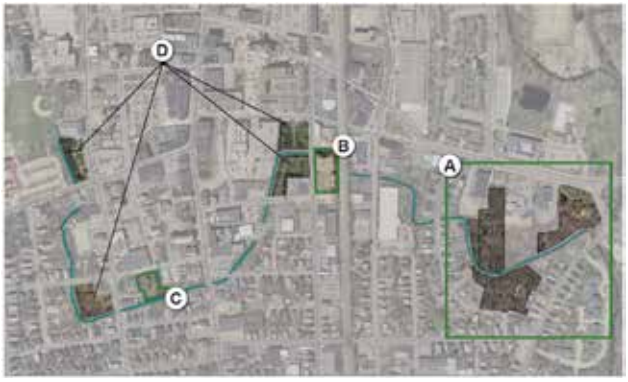
City of Brockton, Planning Department:

Tax Parcels

Google Earth 2018

Basemap

THE BLUE BROOK



Massachusetts Office of Geographic Information (MassGIS):

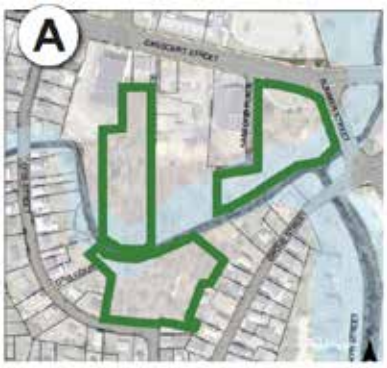
USGS Color Ortho Imagery (2013/2014)

City of Brockton, IT Department:

Waterways

City of Brockton, Planning Department:

Tax Parcels



Massachusetts Office of Geographic Information (MassGIS):

FEMA National Flood Hazard Layer (2017)

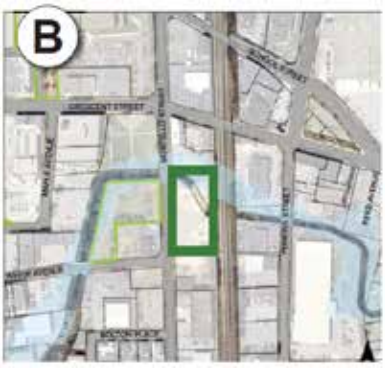
USGS Color Ortho Imagery (2013/2014)

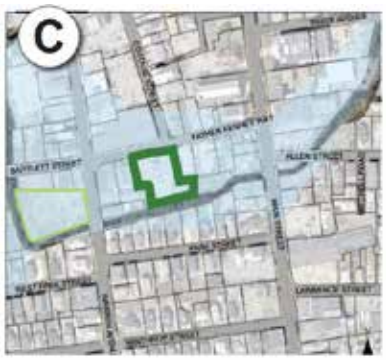
City of Brockton, IT Department:

Waterways

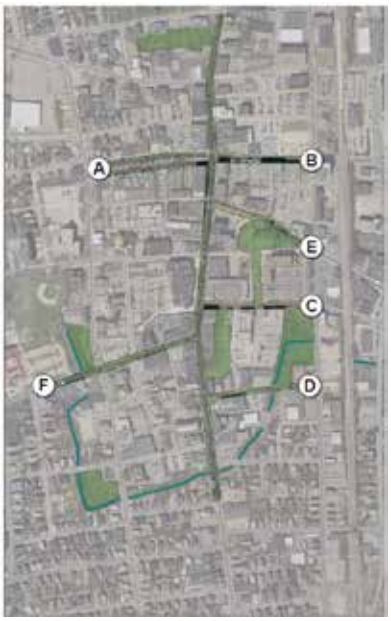
City of Brockton, Planning Department:

Tax Parcels





THE SPINE



Massachusetts Office of Geographic Information (MassGIS):

USGS Color Ortho Imagery (2013/2014)

City of Brockton, IT Department:

Waterways

City of Brockton, Planning Department:

Tax Parcels

Massachusetts Office of Geographic Information (MassGIS):

FEMA National Flood Hazard Layer (2017)

USGS Color Ortho Imagery (2013/2014)

City of Brockton, IT Department:

Waterways

City of Brockton, Planning Department:

Tax Parcels

THE SPINE

Massachusetts Office of Geographic Information (MassGIS):

Massachusetts Historical Commission (MHC) Historic Inventory

USGS Color Ortho Imagery (2013/2014)

City of Brockton, IT Department:

Waterways

City of Brockton, Planning Department:

Tax Parcels

GREEN BLOCKS

Massachusetts Office of Geographic Information (MassGIS):

USGS Color Ortho Imagery (2013/2014)

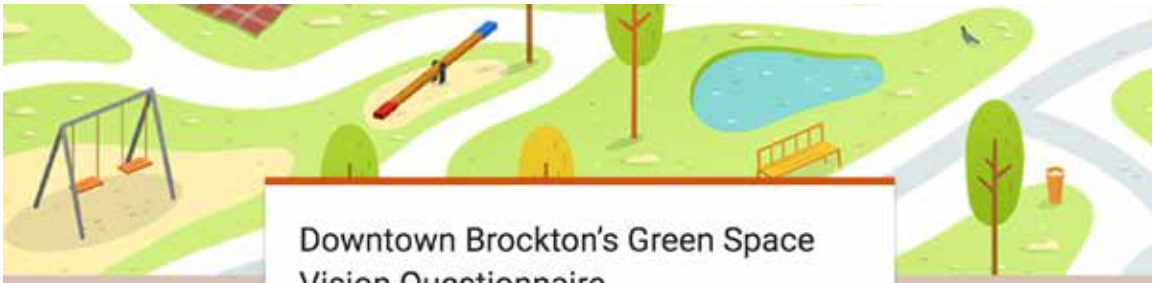
City of Brockton, IT Department:

Waterways

City of Brockton, Planning Department:

Tax Parcels

Survey



Downtown Brockton's Green Space Vision Questionnaire

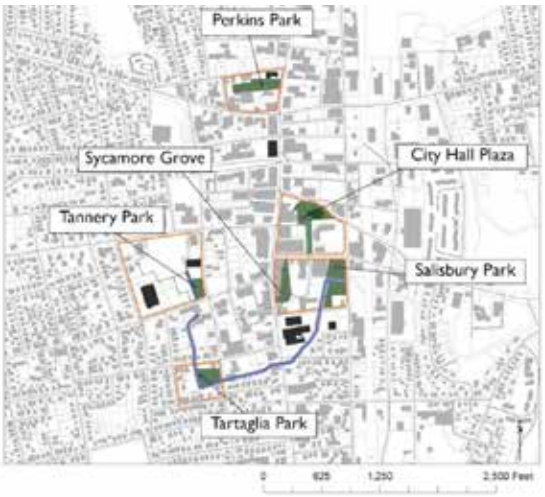
The City of Brockton has partnered with the Conway School, a graduate program in landscape planning and design, to create a conceptual plan for Brockton's downtown green spaces. The goal of the project is to improve the connectivity and function of these parks, and promote safe and accessible outdoor spaces downtown.

We want to hear from you! Please take 10 minutes to have your voice heard and don't forget to share this with your fellow community members! The survey period ends on Tuesday, February 20 at 5pm. Thank you for participating.

* Required

Do you live or work downtown? If not, approximately how many miles do you live or work from downtown Brockton? *

	0 - 1 miles	1 - 3 miles	3 - 5 miles	6 + miles	N/A
I live	○	○	○	○	○
I work	○	○	○	○	○



- [ ] City Hall Plaza (School Street)
- [ ] Salisbury Park (Crescent Street and Montello Street)
- [ ] Tennery Park (Warren Avenue and Belmont Street)
- [ ] Sycamore Grove (Crescent Street and Maple Avenue)
- [ ] Tartaglia Park (Warren Avenue and Bartlett Street)
- [ ] Perkins Park (North Main Street and Spring Street)
- [ ] None of the above
- [ ] Other: _____

On average, how often do you visit each park?

	City Hall Plaza (School Street)	Salisbury Park (Crescent Street and Montello Street)	Tannery Park (Warren Avenue and Belmont Street)	Sycamore Grove (Crescent Street and Maple Avenue)	Tartaglia Park (Warren Avenue and Bartlett Street)	Perkins Park (North Main Street and Spring Street)
Daily	☐	☐	☐	☐	☐	☐
Once a week	☐	☐	☐	☐	☐	☐
Once a month	☐	☐	☐	☐	☐	☐
Once a year	☐	☐	☐	☐	☐	☐
Never	☐	☐	☐	☐	☐	☐

On average, when do you visit each park?

	City Hall Plaza (School Street)	Salisbury Park (Crescent Street and Montello Street)	Tannery Park (Warren Avenue and Belmont Street)	Sycamore Grove (Crescent Street and Maple Avenue)	Tartaglia Park (Warren Avenue and Bartlett Street)	Perkins Park (North Main Street and Spring Street)
Morning	☐	☐	☐	☐	☐	☐
Afternoon	☐	☐	☐	☐	☐	☐
Evening	☐	☐	☐	☐	☐	☐
Weekdays	☐	☐	☐	☐	☐	☐
Weekends	☐	☐	☐	☐	☐	☐
Never	☐	☐	☐	☐	☐	☐

Which activities have you participated in at the parks you checked above?

	City Hall Plaza (School Street)	Salisbury Park (Crescent Street and Montello Street)	Tannery Park (Warren Avenue and Belmont Street)	Sycamore Grove (Crescent Street and Maple Avenue)	Tartaglia Park (Warren Avenue and Bartlett Street)	Perkins Park (North Main Street and Spring Street)
Exercise	☐	☐	☐	☐	☐	☐
Play	☐	☐	☐	☐	☐	☐
Passing through	☐	☐	☐	☐	☐	☐
Leisure	☐	☐	☐	☐	☐	☐
Break from work	☐	☐	☐	☐	☐	☐
None	☐	☐	☐	☐	☐	☐
Other	☐	☐	☐	☐	☐	☐

What activities would you like to see offered at the parks downtown?

Your answer

How do you get to these parks? *

- [ ] Drive
- [ ] Walk
- [ ] Bicycle
- [ ] Bus
- [ ] Commuter rail
- [ ] I don't
- [ ] Other:

Please tell us about your perceptions of these parks, even if you haven't visited any of them.

	City Hall Plaza (School Street)	Salisbury Park (Crescent Street and Montello Street)	Tannery Park (Warren Avenue and Belmont Street)	Sycamore Grove (Crescent Street and Maple Avenue)	Tartaglia Park (Warren Avenue and Bartlett Street)	Perkins Park (North Main Street and Spring Street)
Safe	☐	☐	☐	☐	☐	☐
Easy to get to while walking downtown	☐	☐	☐	☐	☐	☐
Space to engage in outdoor recreation activities	☐	☐	☐	☐	☐	☐
Adequate amenities offered	☐	☐	☐	☐	☐	☐
Environmentally healthy and support habitat for wildlife	☐	☐	☐	☐	☐	☐
No opinion	☐	☐	☐	☐	☐	☐
None of the above	☐	☐	☐	☐	☐	☐

What is your perception of Salisbury Brook? *

- [ ] It is an icon of downtown Brockton
- [ ] It should be used for recreational activity
- [ ] It is a natural space that supports habitat and wildlife
- [ ] It does not represent a healthy landscape
- [ ] I am not familiar with it
- [ ] Other:

Parks offer the items listed below. Which of these are most important to you? Pick three. *

- [ ] Improved air quality
- [ ] Increased property values
- [ ] Shade and windbreaks
- [ ] Space for community events
- [ ] Reduced noise
- [ ] Habitat for wildlife
- [ ] Manage stormwater and reduce flood risk
- [ ] Healthy and active lifestyles

In your opinion, which features make a park feel safe? Pick three. *

- [ ] Benches or seating areas
- [ ] Space for city events and entertainment
- [ ] Shade trees
- [ ] Streetlights
- [ ] Large open space
- [ ] Walking paths
- [ ] Playgrounds
- [ ] Restaurants and commercial venues nearby
- [ ] Presence of people
- [ ] Visibility from street
- [ ] Other:

In your opinion, which features make a park enjoyable? Pick the three most important to you. *

- [ ] Benches or seating areas
- [ ] Space for city events and entertainment
- [ ] Shade trees
- [ ] Large open space
- [ ] Walking paths
- [ ] Playgrounds
- [ ] Garden beds
- [ ] Water features
- [ ] Art
- [ ] Restaurants and commercial venues nearby
- [ ] Wildlife and habitat
- [ ] Other:

Please describe what you think is working at each park. (Example: I like that there are places to bring my kids after work to play in Central Park.)

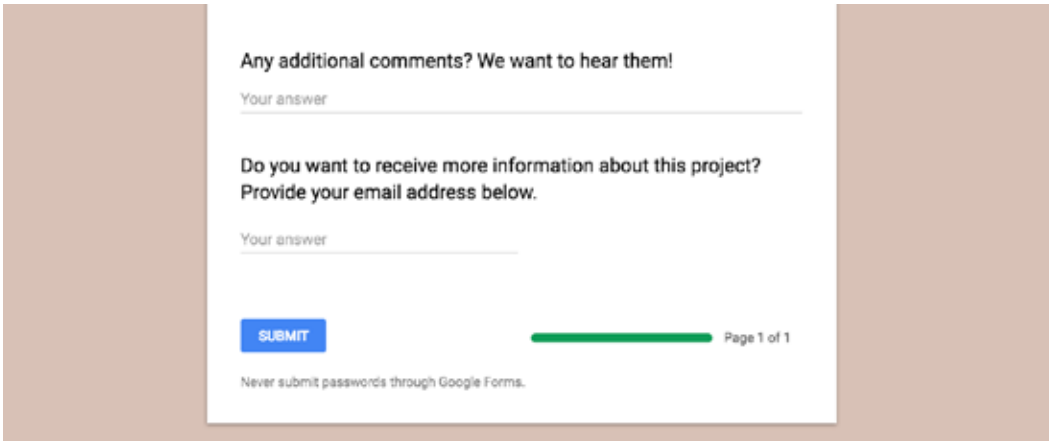
Your answer

Please describe what you think is not working at each park. (Example: There are no benches in Central Park.)

Your answer

Are there other green spaces in Brockton that you visit? What are they?

Your answer


Any additional comments? We want to hear them!
Your answer
Do you want to receive more information about this project? Provide your email address below.
Your answer
SUBMIT
Page 1 of 1
Never submit passwords through Google Forms.

Works Cited

"A Blueprint for Brockton – Comprehensive Plan." A Blueprint for Brockton, City of Brockton , Oct. 2017, www.ablueprintforbrockton.com/wp-content/uploads/2017/05/Brockton-Master-Plan-Comprehensive-FINAL.pdf.

"About." Lurie Garden, 22 Mar. 2018, www.luriegarden.org/about/.

"About Us." About Brockton, City of Brockton , www.brockton.ma.us/Community/AboutBrockton.aspx.

"APA Policy Guide on Neighborhood Collaborative Planning" American Planning Association, April 1998, https://www.planning.org/policy/guides/adopted/neighborhoodcollaborative.htm. Accessed 23 March 2018

Arbeene, Eric, et al. Natural Hazard Mitigation Plan for the Old Colony Region. Old Colony Planning Council, 2015.

Baker, Charles D. Department of Housing and Community Development. p. 3.

Benefits of the Tree City USA Program - The Arbor Day Foundation. https://www.arborday.org/programs/treecityusa/benefits.cfm. Accessed 14 Mar. 2018.

"Benefits of Trees." Urban Releaf, 10 Apr. 2012, http://www.urbanreleaf.org/get-educated/benefits-of-trees.

Bioswales-Standard-Designs.Pdf. http://www.nyc.gov/html/dep/pdf/green_infrastructure/bioswales-standard-designs.pdf. Accessed 14 Mar. 2018.

"Brockton, MA." Data USA, Data USA, 2015, datausa.io/profile/geo/brockton-ma/#demographics.

Brockton Two Rivers Master Plan. City of Brcokton. July 2008

Brockton Tree Program Is Taking Root in the City - News - The Enterprise, Brockton, MA - Brockton, MA. http://www.enterprisenews.com/news/20180306/brockton-tree-program-is-taking-root-in-city. Accessed 8 Mar. 2018.

Brown, E., Caraco, D., Pitt, R. 2004. Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments. Center for Watershed Protection, Ellicott City, MD & University of Alabama, Tuscaloosa, AL

Bureau, U. S. Census. American FactFinder - Community Facts. https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml. Accessed 11 Mar. 2018.

Burgess, Anna. "New Brockton Park to Be Dedicated as a Testament to Tartaglia." The Enterprise, Brockton, MA, http://www.enterprisenews.com/news/20170619/new-brockton-park-to-be-dedicated-as-testament-to-tartaglia. Accessed 9 Mar. 2018.

Carroll, Matt. "Massachusetts Snapshot: Population Density 2011." Boston.com, The Boston Globe, 17 Jan. 2013, archive.boston.com/yourtown/specials/snapshot/massachusetts_snapshot_population_2011/.

Chapter 8.66 - Tree Protection | Code of Ordinances | Cambridge, MA | Municode Library. https://library.municode.com/ma/cambridge/codes/code_of_ordinances?nodeId=TIT8HESA_CH8.66TRPR. Accessed 13 Mar. 2018.

City of Brockton. City of Brockton 2013 Open Space and Recreation Plan. 2013.

City of Brockton. Walk Assessment, Brockton, MA. 2014.

Clements, Janet, et al. The Green Edge: How Commercial Property Investment in Green Infrastructure Creates Value. p. 42.

CNT_Value-of-Green-Infrastructure.Pdf. https://www.cnt.org/sites/default/files/publications/CNT_Value-of-Green-Infrastructure.pdf. Accessed 14 Mar. 2018.

Concord Square Development Company Inc. and Hubert Murray Architect + Planner. Downtown Brockton Smart Growth Design Standards. 2014.

Cruise, Timothy, et al. BROCKTON Downtown Action Strategy.

Donovan, Geoffrey H., and David T. Butry. "Trees in the City: Valuing Street Trees in Portland, Oregon." Landscape and Urban Planning, vol. 94, no. 2, Feb. 2010, pp. 77–83. CrossRef, doi:10.1016/j.landurbplan.2009.07.019.

Downtown Brockton Smart Growth District Design Standards.

"D.W. Field Park." City of Brockton D.W. Field Park Page, The City of Brockton, www.brockton.ma.us/government/departments/dwfieldpark.aspx.

"Ecosystem Services in EnviroAtlas." EPA, Environmental Protection Agency, 19 Sept. 2016, www.epa.gov/enviroatlas/ecosystem-services-enviroatlas.

"Enterprise Center." Trinity Financial, http://www.trinityfinancial.com/portofolio/enterprise-block/. Accessed 17 Mar. 2018.

Flood Resilience Checklist. Environmental Protection Agency. Washington, D.C. 2014, p. 6.

Forman, Richard T. Urban Ecology: Science of Cities. Cambridge University, 2014.

Fraider, Mike, et al. : Tree City USA Take Pride in a Greener Community. Arbor Day Foundation. no. 9, 1872, p. 8.

"George E. Keith." Keith Park Neighborhood Association, Keith Park Neighborhood Association, kpnabrockton.weebly.com/george-e-keith.html.

Gi-Cost-Benefit.Pdf. https://coast.noaa.gov/data/digitalcoast/pdf/gi-cost-benefit.pdf. Accessed 18 Mar. 2018.

"Greening the Gateway Cities Program." Mass.gov, Mass.gov, www.mass.gov/service-details/greening-the-gateway-cities-program.

Harriman, BSC Group, FXM Associates, McMahon Associates. A Blueprint for Brockton: Final Comprehensive Master Plan. 2017.

Hellmund, Paul, and Daniel Smith. Designing Greenways: Sustainable Landscapes for Nature and People. Island, 2006.

High Performance Landscape Guidelines, 21st Century Parks for NYC. The Design Trust for Public Space in collaboration with the New York City Department of Parks and Recreation. 2010.

Hubert Murray Architect + Planner. Brockton Two Rivers Master Plan. 2008.

"Innovative gardens help manage stormwater while beautifying Detroit neighborhoods". University of Michigan, Michigan News, Nov. 25, 2015, http://ns.umich.edu/new/multimedia/videos/23293-innovative-gardens-help-manage-stormwater-while-beautifying-detroit-neighborhoods

I-Tree Streets. https://www.itreetools.org/streets/index.php. Accessed 14 Mar. 2018.

Jessup, Kelsey, and Mara Elana Burstein. Anastasia Loukaitou-Sideris. p. 274.

John Jay Park : NYC Parks. https://www.nycgovparks.org/parks/john-jay-park-and-pool. Accessed 13 Mar. 2018.

Klein AM., Vaissiere B, Cane JH, Steffan-Dewenter I, Cunningham SA, Kremen C (2007) Importance of crop pollinators in changing landscapes for world crops. Proceedings of the Royal Society B: Biological Sciences 274: 303–313;

Landers, D, and A Nahlik. "Final Ecosystem Goods and Services Classification System (FEGS-CS)." U.S. Environmental Protection Agency, Washington, DC, EPA/600/R-13/ORD-004914, 2013.

"Learn About Environmental Justice." EPA, Environmental Protection Agency, 27 Feb. 2018, www.epa.gov/environmentaljustice/learn-about-environmental-justice.

Leff, Michael. "The Sustainable Urban Forest A Step-by-Step Approach." i-Tree, Davey Institute / USDA Forest Service, 27 Sept. 2016, www.itreetools.org/resources/content/Sustainable_Urban_Forest_Guide_14Nov2016.pdf.

"Little Green Places Poster" celebrateurbanbirds.org, Mar. 15, 2018, https://celebrateurbanbirds.org/wp-content/uploads/2012/10/LittleGreenPlacesPosterQuarters.pdf

Makowski, Ann. "Pollinator Park." Ann Makowski, SEGD, 28 Feb. 2017, segd.org/pollinator-park.

Marcus, Clare Cooper and Carolyn Francis, editors. People Places: Design Guidelines for Urban Open Space. Van Nostrand Reinhold, 1990.

Massachusetts Pollinator Protection Plan. 2017, Massachusetts Pollinator Protection Plan, www.mass.gov/files/documents/2017/06/zw/pollinator-plan.pdf.

"MassGIS Data: 2010 U.S. Census Environmental Justice Populations." MassGIS Data: 2010 U.S. Census Environmental Justice Populations | Massachusetts Document Repository, MassGIS (Bureau of Geographic Information), Commonwealth of Massachusetts EOTSS, docs.digital.mass.gov/dataset/massgis-data-2010-us-census-environmental-justice-populations.

"MassGIS Data: Impervious Surface 2005." MassGIS Data: Impervious Surface 2005 | Massachusetts Document Repository, MassGIS (Bureau of Geographic Information), Commonwealth of Massachusetts EOTSS, docs.digital.mass.gov/dataset/massgis-data-impervious-surface-2005.

Nature Conservancy | How Urban Trees Can Save Lives. https://global.nature.org/content/healthyair?src=r.global.healthyair. Accessed 13 Mar. 2018.

Ollerton J, Winfree R, and Tarrant S (2011) How many flowering plants are pollinated by animals? Oikos 120:321-326.

Outdoor Gyms: A How-to Guide | Life and Style | The Guardian. https://www.theguardian.com/lifeandstyle/2014/jul/17/outdoor-gyms-a-how-to-guide. Accessed 9 Mar. 2018

"Outdoor Gyms Catching On in U.S. Parks" Emily Attwood October 2012, Athletic Buisiness, https://www.athleticbusiness.com/outdoor-gyms-catching-on-in-u-s-parks.html

"Overview of the Milliennium Ecosystem Assessment." Millennium Ecosystem Assessment, 2005, www.millenniumassessment.org/en/About.html#1.
Patrick, Deval L., et al. The Status of Childhood Weight in Massachusetts, 2009-201. p. 147.

"Park Ambassador" City of Bloomington, Indiana. https://bloomington.in.gov/parks/parks/ambassador Accessed 25 March 2018.

"Park Ambassadors" Allen Parks Foundation. http://allenparksfoundation.org/park-ambassador/ Accessed 25 March 2018.

"Park Ambassador Volunteer Opportunities" Liberty, Missouri. https://libertymissouri.gov/2295/Park-Ambassador-Volunteer-Opportunities Accessed 25 March 2018.

"Parks Ambassador" City of Vaughan, CA. https://www.vaughan.ca/services/residential/parks_forestry_operations/safe_city/park_ambassador/Pages/default.aspx Accessed 25 March 2018.

"Preliminary Data Summary of Urban Storm Water Best Management Practices." EPA, Environmental Protection Agency, Washington, D.C. EPA-821-R-99-012. August 1999. Chapter 4.

"QuickFacts." U.S. Census Bureau QuickFacts: Brockton City, Massachusetts, U.S. Census Bureau, www.census.gov/quickfacts/fact/table/brocktoncitymassachusetts/PST045217.

"Rain Gardens (BioRetention Cells) - a Stormwater BMP" PennState Extension, https://extension.psu.edu/rain-gardens-bioretention-cells-a-stormwater-bmp

"Rain Gardens and Bioswales" Soil Science Society of America, https://www.soils.org/discover-soils/soils-in-the-city/green-infrastructure/important-terms/rain-gardens-bioswales

Randall, David K. "Maybe Only God Can Make a Tree, but Only People Can Put a Price on It." New York Times. April 18, 2007.

Santec Consulting Services Inc. Downtown Brockton Urban Revitalization Plan. 2016.

Saulmon, Greg. "Birds of Holyoke" http://birdsdowntown.com/birds-of-holyoke/ Accessed 23 March 2018.

"Sediment Forebays" Massachusetts Clean Water Toolkit (MassDEP), http://prj.geosyntec.com/npsmanual/sedimentforebays.aspx

STRATUM FAQs.Pdf. http://www.itreetools.org/streets/resources/STRATUM%20FAQs.pdf. Accessed 14 Mar. 2018.

System of Registries | US EPA. https://ofmpub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do?details=&glossaryName=Green%20Infrastructure%20Glossary. Accessed 14 Mar. 2018.

Tensen, Tim, and Andrew Kilduf. A Plan Takes Root: Brockton Urban Agricultural Plan. The Conway School, 2017.

Thadani, Dhiru A. The Language of Towns and Cities: A Visual Dictionary. Rizzoli, 2010.

"The Basics of Public Engagement." Institute for Local Government, http://www.ca-ilg.org/getting-started-0. Accessed 15 Mar. 2018.

The Economic Benefits of Green Infrastructure: A Case Study of Lancaster, PA. p. 20.

The Taunton River and Its Watershed – Taunton River Watershed Alliance. http://savethetaunton.org/the-taunton-river-and-its-watershed/. Accessed 13 Mar. 2018.

Tree Maintenance - Public Works - City of Cambridge, Massachusetts. https://www.cambridgema.gov/theworks/ourservices/urbanforestry/treemaintenance1. Accessed 13 Mar. 2018.

Trice, Amy. Daylighting Streams: Breathing Life into Urban Streams and Communities. AmericanRivers.org.

TRWA-2017-Monitoring-Summary.Pdf. http://savethetaunton.org/wp/wp-content/uploads/2018/01/TRWA-2017-Monitoring-Summary.pdf. Accessed 13 Mar. 2018.

U.S. Environmental Protection Agency. 2008. Reducing urban heat islands: Compendium of strategies. Draft. https://www.epa.gov/heat-islands/heat-island-compendium. pg. 32.

US EPA, OW. "Green Infrastructure Cost-Benefit Resources." US EPA, 1 Oct. 2015, https://www.epa.gov/green-infrastructure/green-infrastructure-cost-benefit-resources.

Vigil, Kenneth M. Clean Water: An Introduction to Water Quality and Water Pollution Control. 2nd ed. Oregon State University, 2003.

Watershed Description. http://www.tauntonriver.org/topmanagementissues.htm. Accessed 13 Mar. 2018.

Wilbur Smith Associates. City of Portland Wayfinding System Study. City of Portland, 2008, www.portlandmaine.gov/DocumentCenter/View/2214.

Image Sources

Introduction

Brockton Shoe Industry Image Source: Wikimedia Accessed 2018

Historic Postcard of Brockton City Hall Image Source: Cardcow.com

D.W. Field Park Image Source: Wikimedia Accessed 2018

Existing Conditions

Aerial View of Brockton Image Source: Google Earth 2018

Stormwater Discharge at Salisbury Brook Image Source: Emmy Titcombe

Trash Along Brook Image Source: Two Rivers Master Plan. p.6.

Downtown Parks Analysis

Aerial Views Image Source: Google Earth 2018
Street Views. Google Earth 2018

Process and Guiding Principles

Community Meeting One Photo Image Source: Shane O'Brian 2017

Community Meeting Two Photo Image Source: Rob May 2018

Park Specific Recommendations

Way-finding Kiosk Image Source: City of Vancouver Kiosk - Flickr Creative Commons, Oran Viriyincy

Bicycle Racks Image Source: photos-public-domain

Solar Shade Structure Image Source: Situ/Studio NYC

Native Plants Image Source: Lurie Garden Chicago - Flickr Creative Commons JR P

Milkweed Image Source: Flickr Creative Commons, Esther Westerveld

Outdoor Gym Image Source:

Monarch Butterfly Image Source:

Wild Brockton Turkeys Image Source: Rob May 2018

Urban Mammals Image Source: pixabay

Park Bench and Robin Image Source: Flickr Creative Commons Dan Keck

Downtown Recommendation Concepts

Blue Brook Birds Image Source: celebrateurbanbirds.org

Green Blocks "Enterprise Block" Image Source: C.O.B. Downtown Action Strategy

Toolkit for Activation

Street Trees Image Source: Environmental Protection Agency

Splash Pad Image Source: Fountain Centennial Olympic Park - Wikimedia Commons

Chess Players Image Source: David Shankbone - Wikimedia Commons

Complete Streets Before and After Image Source: Flickr Creative Common nycstreets

Raised Crosswalk Image Source: Flickr creative commons - Eric Fischer

Bioretention Bump-out Image Source: Environmental Protection Agency

Cool Roof Image Source: Environmental Protection Agency

Biorentention Basin Image Source: Environmental Protection Agency

Public Art Image Source: @think_katrina Katrina Johnston-Zimmerman

Amenities for Outdoor Dining Image Source: Environmental Protection Agency

Community Garden Image Source: @think_katrina Katrina Johnston-Zimmerman

Magnolia Park Image Source: @think_katrina Katrina Johnston-Zimmerman

Public Art Image Source: @think_katrina Katrina Johnston-Zimmerman

About Us

The Conway School

The Conway School's graduate program in landscape design and planning equips students with a Master of Science in Ecological Design in ten months. Students work on real projects for real clients, learning an effective, practical design process rooted in ecological thinking. Through Conway's intimate, intensive, and collaborative environment, students gain the skills they need to address complex environmental and social challenges, such as water quality, climate resiliency, food access and security, habitat connectivity, and environmental justice.

The Design Team

Sunnie Joh is an active member of her local community in the Northern Catskills, New York. Co-founder of an arts and culture non-profit organization, the Bushel Collective supports community-led development and local sustainability through the public programming, exhibitions, and community partnerships. Her professional work spans disciplines, from architectural design and construction to environmental and agricultural education and advocacy. Sunnie holds a Bachelor's degree in Architecture from The Cooper Union in New York City.

Amanda Pebler is originally from the San Francisco Bay Area. There, she worked for environmental non-profits managing communications efforts surrounding water resource management and behavioral science. Most recently she worked in education as an assistant teacher. Amanda graduated from Oregon State University with a B.S. in Environmental Science with a focus on conservation and sustainability. Amanda is a LEED Green Associate and holds a commitment to sustainable design.

Emmy Titcombe grew up in Alaska but is most recently from central New York. She is a recent graduate of St. John's College where she studied philosophy and history of mathematics. Over the last eight years, Emmy has worked in the dairy industry and has taught in various contexts from the preschool playground to the college classroom. She enjoys playing music, hiking, and observing how we interact with the natural and built environment. Emmy is excited to bring together her love of teaching and the outdoors in the field of landscape design.

Brockton is a culturally diverse city that is in the midst of growth and redevelopment. In order to improve quality of life for current residents and attract new investment to the downtown area, Brockton is seeking to revitalize its downtown parks. This plan evaluates the assets and challenges faced by Brockton's green spaces and recommends strategies for improving their social and ecological function.

the Conway School
Graduate Program in Sustainable Landscape Planning + Design